

ANNALS
OF
OTOLOGY, RHINOLOGY
AND
LARYNGOLOGY

INCORPORATING THE INDEX OF OTOLARYNGOLOGY.

VOL. XXVII.

DECEMBER, 1918.

No. 4.

LXI.

MULTIPLE OSTEOMA OF THE NASAL ACCESSORY
SINUSES; REPORT OF A CASE COMPLICATED
BY SYPHILIS; OPERATION; AUTOPSY.

BY WILLIAM LEDLIE CULBERT, M. D.,

NEW YORK.

Although osteoma of the nasal accessory sinuses is comparatively rare, there is a considerable literature of the subject, which is, however, largely French and German. The English have reported a number of cases, but, as far as the present writer knows, have made no comprehensive study of the subject; the Americans also show this same lack of exhaustive treatment; Andrews¹ article (1887) on orbital osteoma and one by Guntzer² on nasal osteoma are the only ones that treat the subject extensively. There are also shorter articles by Knapp,^{3,4} Fridenberg,⁵ Van Wagenen,⁶ Chapman,⁷ and Barnhill,⁸ and a few other case reports.^{9,18}

The rareness of bony growth, of the orbit at least, may be judged from the fact that Andrews reported only eight cases of orbital exostosis out of almost 430,000 cases of eye disease, or 1 in 53,700; Adamük¹⁹ makes a similar statement. In

1881, Bornhaupt²⁰ reported 49 cases of osteoma, of which 23 were of the frontal sinus, 11 of the ethmoid labyrinth, 10 of the antrum of Highmore, and 5 of the ethmoid and sphenoid sinuses. Hermann Knapp³ in the same year reported 11 cases of osteoma of the frontal sinus, of which he stated that his own was the only American case on record. Haas²¹ in 1901 collected 63 cases, 21 of which were nasal. Gerber²², in 1907, reported 87 true cases of osteoma of the frontal sinus. Taranto²³ (Paris Thesis, 1901) gave 129 cases of osteoma of the nasal accessory cavities collected from the entire range of medical literature, and, up to 1914, Boenninghaus²⁴ had added 74 new cases to these 129, making a total of 203.* Since that time, about a dozen other cases have been reported, so that today we have a rough total of 215, representing all the cases in the medical literature from 1748 to the present time.

Osteomata are on record as occurring from the fourth to the seventy-fourth year. Over 50 per cent are noticed during adolescence, and about 30 per cent more before the thirtieth year of life. These growths are of three varieties, the hard or eburnated, the compact, and the spongy. Their dimensions, roughly speaking, range from that of a bean to that of a good-sized potato. They are reported as weighing from 7 to 440 gm. This latter is Hilton's²⁵ case of 14¼ ounces, an osteoma† of the sphenoid and orbit, apparently the largest human case on record. In comparison we might mention an ivory exostosis of over 16 pounds weight, from the forehead of an ox, on exhibition in the Museum of the College of Surgeons, London.²⁶ The extreme hardness attained by eburnated osteoma may be judged by the fact that in four cases that came to operation the difficulty of making any impression on the ivory-like growth with chisel, saw, or trephine was so great that in each case the operation had to be abandoned.²⁷ Grossman²⁸ removed one orbital exostosis by cross-drilling with a dentist's burr.

*These figures are cited from Chapman's⁷ report of Boenninghaus' article, second edition, 1914, as only the first edition was available to the writer. In this edition it is stated that the cases had been collected from the literature up to 1910; they numbered 198, not 148, as misprinted in Pfeiffer's article.

†Hilton's case is usually considered as an osteoma; Gerber, however, seems inclined to class it as an exostosis.

Osteomata are generally of slow growth, the development frequently covering a period of ten years and sometimes much longer before the annoyance has caused the patient to seek relief. Although these tumors are histologically benign, they are clinically malignant, since if left alone they exert pressure into the cavities of the orbit and the cranium. The only treatment is complete removal. In Boenninghaus' collection the mortality of the cases operated before 1885 was 16 per cent, and for those operated since that time, 3 per cent. According to Pfeiffer,²⁹ in the preantiseptic era the mortality was very high, but with the introduction of asepsis, improved operative technic, and recognition of the fact that an osteoma is an encapsulated tumor, the mortality has greatly decreased. Hermann Knapp³ stated that the safety and success of operations of osteoma, not only of the frontal sinus but of all the cavities of the head, lay in shelling out the tumor from within its capsule. According to him,⁴ the real element of danger occurs when there is a long prepared diseased condition of the tissues surrounding the tumor. Where this exists, the operation may be the inciting cause of meningitis or encephalitis. As chiseling through healthy bone is not dangerous, the osseous tumors which develop in comparatively healthy pneumatic cavities can be removed with safety. As a matter of fact, when death occurs it is usually from intracranial complications—meningitis or brain abscess—and generally in cases where projections of the tumor reach into the cranium. With early operation the prognosis is favorable.

Classification.—According to Gerber, the nomenclature of bone tumors in the older literature was often obscure, and a tendency existed (a) to make no distinction between exostoses (frontal bone and orbit) and true osteomata of the sinuses; and (b) to group together all the osteomata of the ethmoid and frontal region. Gerber has classed as exostoses the cases of Lucas, Keate, Cooper (and questioned those of Hilton and Hoppe), which are elsewhere regarded as osteomata. It is also interesting that in his attempt to obtain a correct classification of osteomata in imperfectly reported cases, Gerber located the growth according to the dislocation of the ocular globe; when the protrusion of the eye is forwards only, he classifies the osteoma as sphenoidal or orbital; when the pro-

trusion is exclusively outwards, tumor of the ethmoid is inferred; where the globe is directed upwards, the maxillary sinus is involved; while a propulsion forwards, outwards, and downwards is pathognomonic for tumors of the frontal sinus. Knapp states that the onward march of an osteoma growing in the frontal sinus must push the globe in these three directions. The X-ray is today our best means of information as to the form, location and size of the tumor.

Growth and Origin.—Osteomata may involve one sinus or cavity only, or they may develop symmetrically, involving corresponding sinuses. They may be multiple distinctive growths with apparently different foci, or they may send out projections from a single point of origin. This point of origin may be the frontal, lacrimal, or nasal bones, the nasal process of the superior maxilla, the turbinates, etc. Of Borahaupt's 49 cases, 34 originated in the ethmoid. Gerber gives the proportion of tumors arising in the ethmoid as 12 to 8 to those arising in the frontal sinus. According to Gützer, "in most instances the point of origin is difficult to demonstrate, the weak connection with the nasal skeleton is so easily destroyed in operative manipulation, or, by pressure, atrophy or pus formation, the pedicle may be destroyed and the osteoma become sessile or entirely free."

Histopathic Origin.—Osteomata have been variously described as originating from the diploe of the frontal bone (Virchow³⁰), as ossifications of the Schneiderian membrane lining the nasal cavities (Dolbeau³¹), as of periosteal origin (Sappey, see Dolbeau), as enchondroma (Rokitansky³²), or remnants of fetal cartilage which later ossify—Arnold³³ and Tillmans³⁴ have elaborate theories to this effect—as originating from connective tissue rudiments (Pfeiffer), as ossifications of mucous polypi (Cloquet), as developments of the small exostoses, osteophytes, or hyperostoses of the frontal sinuses (Gerber). Cruveilhier³⁵, 1856, believed that they develop in the interior of the bone in such a manner as to push the peripheral layer of bone before them like a capsule. The question is still open.

Sinuitis as a Complication.—Before discussing the theories of causation of osteoma of the nasal accessory cavities, it would perhaps be well to consider the complications frequent-

ly accompanying these tumors. The proportion of osteoma with and without complication is not known. Hucklenbroich³⁶ in 1905 found six out of sixteen (37.5 per cent) of the more recent cases complicated by sinusitis. These are the cases of Mitvalsky,³⁷ Coppez³⁸ (two cases), Tauber,³⁹ Zimmermann,⁴⁰ and Witzheller.⁴¹ The present writer has also noted eight others, including his own, Knapp,⁴² Satteler,¹³ Pfeiffer, Gerber, Van Wagenen, and Chapman. Mitvalsky (p. 613) states that the granulations and the polyps of the mucous of the frontal sinus as auxiliaries of osteoma of the nasal accessory cavities have long been known; and that Virchow, who rejected Cloquet's idea that the osteoma developed through the ossification of these polyps, neglected the question whether (a) the affection of the frontal sinus precedes the osteoma and is the determining cause of its evolution, or (b) whether the affection of the sinus is merely the result of the presence of the growth in course of evolution. Coppez considers that the permeability of the nasofrontal canal has to do with the presence or not of sinusitis. When the canal is closed, the products of mucosecretion have no means of evacuation; they stagnate in the depths of the sinus, ferment and decompose there, with inflammation and suppuration of the sinuses as inevitable consequences. He assumes that the presence of the osteoma is responsible for an edematous mucosa which forms folds and obstructs the opening of the canal, together with the progressively growing osteoma.

The view that complications in the frontal sinus occurring with osteoma were inevitably direct results of the obstructing growth has been generally accepted. Gerber is apparently the first writer to consider that a sinusitis might antedate the growth of an osteoma and be a causal factor in its development. According to him, latent torpid sinusitis producing inflammatory irritations is comparatively frequent in the frontal sinuses. The irritations thus produced, which are capable of causing ossifications of bone or periosteum, exert their maximum influence during the period of formation of bone and development of the frontal sinuses, thus explaining the youthful age of the majority of the cases. Gerber states (1907) that up to recent times there has reigned a false conception of the inflammatory modifications of the frontal sin-

uses, which are often due to conditions left by the many violent inflammations of the nasal fossæ. Although these inflammations of the sinuses generally disappear without leaving any traces, they may, however, persist and become true empyemas with more or less involvement of the bony walls of the sinus in the morbid process. The frontal bone itself has been affected by such lesions far more often than is generally credited. Furthermore, it is well known that such symptoms may survive in individuals enjoying excellent health.

The case reported by Chapman of frontal osteoma in a woman of fifty-two years, who had suffered from headaches for three years following grippe, seems to be illustrative of Gerber's argument. Doubtless, in this case, the inflammatory condition left by grippe either caused an osteomatous growth to develop or else speedily accelerated a latent growth of such small size that it had given no indications of its presence up to the age of fifty-two years. In one of his cases, Hermann Knapp⁴ wrote that a chronic inflammation in the pneumatic cavities of the upper part of the face had led to a distension of the left frontal sinus and rendered its osseous wall congested and porous (ostitis), with beginning necrosis. Finally, the youthful age at which sinusitis usually develops should be kept in mind.

Symptoms Accompanying Osteoma.—A considerable number of cases of osteoma are reported as being absolutely without symptoms except a greater or less displacement of the eye or facial disfigurement. Curiously, this lack of symptoms seems to be independent of the size of the tumor; large growths have been removed where the cosmetic effect was the patient's only interest. There is, however, a whole range of symptoms which frequently accompany osteoma of the nasal accessory cavities; they include nasal obstruction, catarrh, anosmia, difficult respiration, otorrhea, middle ear deafness, etc., and are regarded almost exclusively as pressure symptoms due to the increasing injury of the surrounding parts by the morbid growth. However, there are certain cases with a long history of illnesses, where the probability that an inflammation of the mucous membrane antedated the osteomatous growth is very strong; such cases make one wonder

if an original infection of the tissues lining the nasal cavities was not a causal factor in the production of the osteoma, which in turn added pressure and obstruction to the original trouble.

Osteoma in Cases of Constitutional Maladies.—On this subject the literature gives very little information; a lack of adequate examination of the patient renders many reports unsatisfactory. A few interesting cases are, however, reported: Van Wagenen had a case of frontal osteoma in a patient who previously had suffered from frambesia, a tropical disease caused by a spirillum similar to that of syphilis; he regarded the osteoma as secondary to the infection. Leonte⁴³ gave an etiology of secondary syphilis in a case of nasal osteoma in a man of fifty-four years who had contracted syphilis at twenty-six, followed by secondary syphilis, with much coryza and articular rheumatism at forty. There was no other cause. Gerber also reports an etiology of syphilis in one of his cases of frontal osteoma. Dolbeau reported a case of frontal osteoma in a man of twenty-one years, with a long history of illnesses including typhoid and blennorrhoea. There are other similar reports. Many of the former writers have stated that there was no question of syphilis in their cases, but we might pertinently ask, "How did they know?" The fact that antisyphilitic treatment did not decrease the osteomatous growth is no proof of the absence of specific disease.

Etiology.—The writer has just considered briefly certain conditions possibly contributing to the development of osteoma before reviewing still more briefly the many and confusing hypotheses furnished by the literature. Historically, there are three general theories: (a) The first and oldest theory, that of trauma as a primary cause, is obviously the result of the fact that a number of the earlier cases were complicated by external injuries—falls or blows. At the present time traumatism is generally regarded as a contributory rather than an essential cause, since many cases have been observed where there had been no trauma, and also because of the nature of the growth, which may be symmetrical or multiple. However, a number of fairly late writers, Dubar,⁴⁴ Taranto, and Miodowski,⁴⁵ still are inclined to believe that osteomatous growths can be traced to external

traumatism. (b) The second and most widely held theory is that of an embryonic genesis—an anomaly of growth, a congenital fault—which, as previously stated, various writers have located in bone, periosteum, fetal remnants, etc. Given certain circumstances—a perfectly healthy individual, without constitutional disease, without sinusitis or lesions of the nasal fossæ, with no history of traumatism; at a youthful age, particularly at adolescence, when the growth in the frontal region is greatly accelerated—and this theory affords a satisfactory explanation of the development of osteoma. Under such circumstances, Citelli⁴⁶ attributes these growths to an ontogenetic or morphologic lack of balance in the rapidly growing osseous elements, aided by a more or less congenital predisposition. (c) The third theory is Gerber's intermediary theory, according to which a mechanical cause—external traumatism—or an inflammatory process, sinusitis or lesions of the mucous membrane of the nasal accessory cavities—may provoke or stimulate otherwise quiescent inherent faults of development to active growth.

In conclusion, the writer summarizes his own beliefs on this subject of etiology as follows:

(a) In cases of osteoma of the nasal accessory cavities there is in all probability an original fault or tendency, congenital in the individual.*

(b) Such faults or tendencies, when not irritated to activity, often probably remain quiescent and never develop.

(c) Conditions likely to activate osteomatous growths are:

1. The great neoformative activity in the frontal regions during adolescence.
2. External traumatism.
3. Endogenous irritations: inflammations and infections of

*There is a possibility that abnormalities of bony growth—osteoma, exostosis—occur in a certain type of person; one possibly in whom the organs of internal secretion, pituitary, thyroid, adrenals, cannot maintain a proper balance. The writer was interested to note in his two cases of osteoma—the one reported here and another under observation not yet operated upon—that one, a man of forty-three years, of great physical vitality, had the mentality almost of a child, while the other, a girl of eleven years (referred to me through the courtesy of Dr. Martin Cohen), had the physical development of a mature woman.

the nasal accessory cavities—i. e., the sequelæ of grippe, influenza, and the whole range of nasopharyngeal affections. These conditions are probably the most frequent cause of trouble.

4. Constitutional maladies, particularly syphilis, and possibly other infectious diseases.

5. Above all, combinations of these different causes; of the effect of such combination, the literature furnishes many examples.

REPORT OF A CASE.

In July, 1917, Dr. C. W. Cutler referred a case to me, in which a hard mass growing outwards, forwards, and downwards, apparently from the junction of the frontal and ethmoid, had produced a marked displacement of the right eye and partial closure of the lumen of the right nostril. Dr. Cutler's report read: Right eye separated 41 mm. from median line; left eye, 32 mm. Right eye displaced $3\frac{1}{2}$ mm. outwards, $3\frac{1}{4}$ mm. downwards. Moderate exophthalmos, no diplopia, motility apparently normal. Vision in right eye, 20/20; in left, 20/15. A tentative diagnosis of osteoma of the right orbit was made. The first X-ray plates showed a mass involving both frontal sinuses and the ethmoid, and protruding into the right orbit, with dislocation of the right middle turbinate toward the median line and consequent partial occlusion of the right nasal cavity.

The patient, an Italian, a chauffeur, aged forty-three years, stated that for the past seven years he had noticed a hard mass growing in the inner angle of the right eye. Other than this growth, he was enjoying the most robust health, and was a man of extraordinary vigor and muscular strength, with no history of illnesses. Nevertheless, a Wassermann taken as a matter of routine at the time of examination showed 4 plus. Consequently, several injections of oxycyanate of mercury were given, not with the hope of reducing the growth, but of assisting the healing of the tissues after operation. The only treatment for the osteoma was surgical.

First Operation, July 25, 1917 (Dr. C. W. Cutler present).—Procedure: Killian incision on right side; elevation of scalp; entrance into frontal. The outer table was partly ab-

sorbed and quite thin; immediately underlying it was an enormous, irregularly shaped, eburnated osteoma, which because of its extensive size was more or less flattened from before backwards. It filled the unusually deep right frontal sinus anteroposteriorly and extended for a considerable distance into the left, with complete destruction of the septum. The patient's frontals were enormous, and that part of the tumor lying in them alone was larger than the average frontal sinuses.

In order to approach the growth from above, a transverse incision directed outwards and upwards from the original incision was made above the left eyebrow, and the outer table of frontal bone was removed over the left frontal sinus. When the osteoma was entirely uncovered, it was apparent that the growth came from or extended into the ethmoid and also into the right orbit. Consequently it was furthermore apparent that it would be impossible to get it out without removing the inner two-thirds of the right supraorbital ridge, which was accordingly done. When the osteoma was thus uncovered so that its outlines could be clearly seen, we found that we could not enucleate or even rock it, and it was necessary to bite it out piecemeal with large rongeurs, with the expenditure of great force. In removing the tumor from the frontal sinuses, we discovered that it had eroded through the inner table of the skull; and the dura, which was very thin and apparently adherent, was torn in manipulation, allowing the escape of cerebrospinal fluid. The wound was covered with iodine gauze, and the operation proceeded.

Pus was encountered in the recesses of the frontal sinuses beyond the margins of the tumor; of this pus, several cultures were taken, which later proved sterile. When the pus and the granulation tissue were cleaned away, the tumor was bitten down to the top of the orbit, and a portion as large as a grape shelled out of the orbit. The osteoma in the orbit seemed to be a continuation downwards from the solid frontal growth and also to be in close articulation with the osteoma of the ethmoid.

After we had removed this portion of the eburnated tumor, we noticed that the bone at the base of the frontal sinus and at the lower part of the inner table was of unhealthy appear-



Plate I.—Anteroposterior view of osteoma before first operation, showing osteoma in frontals, ethmoid, and encroaching into right orbit.

ance—fibrous or cancellous in character. Although Dr. Güntzer states that in the hard variety of osteoma, the place of attachment is usually soft or cancellous; nevertheless, in this particular case, I regret that I did not have some of this bone examined for spirochetæ.

The first operation was concluded without opening the nose, since, because of the torn dura, there was fear of cerebral infection. The frontal sinus was packed lightly and the wound sewed up, leaving an opening for drainage near the median line at the inner extremity of the supraorbital ridge, as no drainage could be established through the nose. The patient ran the usual postoperative temperature for three days and proceeded to a slow and uneventful recovery. In September, Dr. Cutler stated that the displacement of the eye outward was slightly increased. Vision, 20/30. Later, in December, Dr. Cutler reported vision 20/20; fundus normal; lateral displacement of right eye same as left, namely, 32 mm. Very slight displacement, if any, downwards. Pupils always equal; normal reaction. Occasional complaint of diplopia in distant vision, but not annoying. Return of eye to normal position and function.

During convalescence the patient received various active antisppecific treatments—intravenous injections of salvarsan, injections of mercuric salicylate, and oxycyanate, as well as potassium iodid. Later, he received antisppecific treatment at Hot Springs, Ark., where, upon his arrival, the Wassermann was said to have been 1 plus, but on his return to New York, three months later, in December, a second Wassermann again showed 4 plus. Further X-rays, including a stereoscopic pair, were taken at the Manhattan Eye, Ear and Throat Hospital, and from these latter it was revealed for the first time that the bony growth extended into the cranial cavity. Realizing that it would be impossible to remove all of the growth, I consulted with various colleagues as to the advisability of further operative procedure. It was decided to be wise and justifiable to remove as much as possible of the growth from the ethmoid and establish free drainage from the frontal into the nose; this decision was strengthened by the amount of pus constantly present.



Plate II.—Lateral view before first operation.

Second Operation, January 8, 1918.—Line of old incision reopened and extremities of two former lateral incisions extended. Scalp retracted, frontal sinuses exposed; very thorough cleaning out of pus. The opening into the dura had granulated over and was carefully avoided. With a Killian chisel an opening was made through the lacrimal bone in order to enter the ethmoid, but when the lacrimal bone was removed the hard eburnated tumor presented, and no progress could be made towards the ethmoid. Therefore, the right middle turbinate was removed as a whole intranasally. During this removal two small nuggets of ivory-like bone dropped out of the mucosa of the middle turbinate body. The way was now cleared for entrance into the ethmoid, which was the seat of several medium sized osteomata, which formed a sort of interlocking combination with closely articulating faces. After these were removed there yet remained one more flat, wedge-shaped growth—hard and glistening—on the right side of the ethmoid which, from its solidity and implacement, as well as the X-ray findings, I realized extended into the brain; this piece was left in, for fear of trauma to the cribriform plate and the meninges. Finally, there was cleaned out from the cancellous tissue a little fistula, containing pus, which lay in the median line just above a line connecting the supraorbital ridges. Examined with a probe, the fistula seemed to have a soft, resilient base, which, when the lumen of the fistula was enlarged and the pus cleaned away, proved to be the longitudinal sinus.

As free drainage had been established from the frontal sinus into the nose through the enlarged infundibulum, the wound was sewed up, after a large cigarette drain had been placed through the infundibulum and out through the nose. In addition to this, a cigarette drain was also placed at the outer extremity of each of the frontal sinuses, to take care of the numerous and extensive recesses requiring drainage.

Several stitches of the wound near the inner canthus of the eye unfortunately did not hold, and because of the pus tore through the tissue. Later, this opening was utilized, together with those of the extreme lateral ends of the sinuses, to wash through the frontal sinuses with Dakin's solution, and yet later to instill dichloramin-T.



Plate III.—Anteroposterior view after first operation, showing osteoma removed from right orbit and frontals, but still present in ethmoid.

The patient recovered from the operation and was in good condition; he was bright, cheerful, talkative, enjoyed going out to the movies, etc. It was impossible, however, to eliminate entirely the pus discharge from the wound, even by the frequent use of dichloramin-T, with which Dr. E. K. Dunham kindly furnished me, although this did cut it down markedly. On February 21st, for the first time, the patient complained of severe headache which kept him awake at night. Medication gave little or no relief. He became progressively worse and more apathetic. A white cell and differential blood count made at this time showed 21,600 leucocytes, with 78 per cent polynuclears; a later count showed 16,000 leucocytes, with 70 per cent polynuclears.

On the morning of March 2d, while sitting up, he suddenly fell over unconscious, and after this he did not talk again. He could be roused at times, but answered questions only by shaking his head, and at noon of the next day, March 3d, he died.

The autopsy was performed March 4th, at 1 p. m., by Dr. J. G. Dwyer. His report follows: Usual postmortem technic. Skull—Removed; on both sides of vertex, in both parietal bones, there was marked rarefying osteitis which had almost penetrated the skull on both sides. Dura slightly congested, but otherwise normal except in region corresponding to above bony lesions, where marked infiltration of dura took place with formation of granulation tissue.

Brain Examined in Situ.—Marked loss of tissue of both frontal lobes, especially on anterior under surfaces, where large brain abscesses with degeneration of all surrounding tissue occurred. About three ounces of pus evacuated from right lobe and two ounces from left. Cultures taken and proved sterile after six days. General appearance of brain as a whole suggestive of "wet brain."

Bone.—Leading from site of the operations to right side was a marked infiltration of the posterior inferior wall of the frontal sinus with newly formed bony tissue.* This new tissue had formed spicules, some of which had penetrated the dura and the frontal lobe, and led to the brain abscess, which

*At the base of the cancellous tissue.

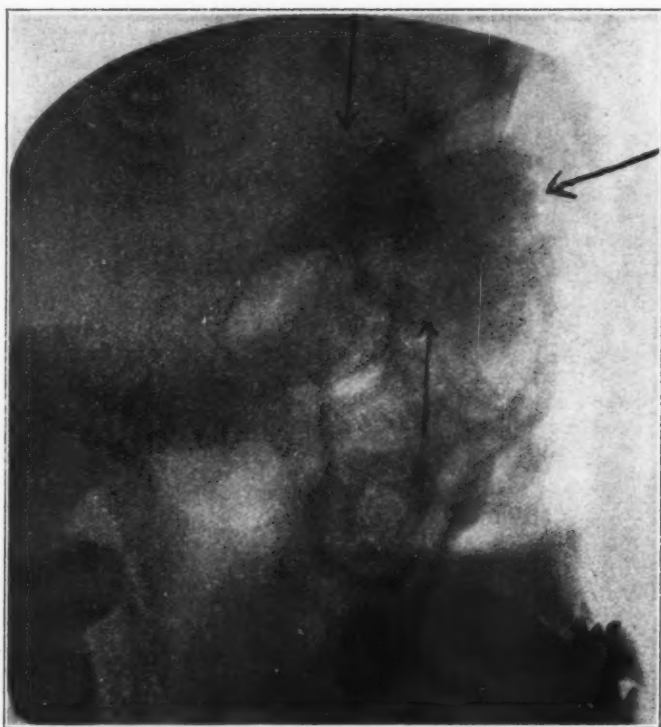


Plate IV.—Lateral view after first operation. Arrow at top indicates upward growth of osteoma into brain.

was probably secondary in character to the bone invasion. A similar but less extensive condition prevailed on the left side. The crista Galli, left superior turbinate, and surrounding bone had been replaced by newly formed hard osteomatous tissue. Antra and other parts of head negative except for obliterating endarteritis. No invasion of orbits per se.

At my special request, Dr. Dwyer had numerous sections of the brain, dura, and portions of the osteomatous bone prepared and examined to see if spirochetæ could be detected. He returned the following histologic report:

Large Mass of Osteoma.—Typical appearance of osteoma, with exception of marked fibrous tissue infiltration within the cortex, separating the osteomatous tissue proper. This is unusual in osteoma of the primary type and leads to the belief that the osteoma may be secondary to or caused by syphilis. Dura over frontal lobes, in contact with rarefied parietal bones, shows a typical syphilitic process with giant cells and marked cellular infiltration. Turbinate bones: The superior on left side markedly hardened, osteomatous in character, shows same infiltrating processes as those of large mass described above. Middle turbinate on right side: process here is less extensive, consisting simply of a round cell infiltration of a small part of the turbinate. (As previously stated, two small osteomatous nuggets dropped out of the mucosa of the right middle turbinate during operation.) Histologically, the osteoma as a whole is multiple, as the different parts affected are not connected with each other. It is a question whether there is a primary osteomatous condition, complicated by syphilis, or an osteomatous condition secondary to syphilis.

SUMMARY.

1. The growth just described was a multiple eburnated osteoma involving the frontals, ethmoid, right orbit, middle and superior turbinates and crista Galli, and protruding into the cranial cavity. The thickness of the cortex, judged from measurements of one or two of the larger pieces removed, varied from 2 to 12 mm. As this osteoma was so large and involved so many sinuses, it was impossible to remove it as a whole, so that no exact size, shape, measurements or weight could be obtained; consequently, the size must be determined

as far as possible by measurements of the shadows in the X-ray plates. In these, Dr. F. M. Law gives the following dimensions: Transverse diameter in the frontal region, 70 mm.; anteroposterior diameter, in the ethmoid region, 40 mm.; in the frontal region, 20 mm. Vertical diameter, 60 mm. A later X-ray gave the measurements from the cribriform plate, downwards and forwards, 45 mm. Within the cranial cavity, above the cribriform plate, the shadow seemed to extent upwards about 20 mm.

2. In the frontal sinuses and the right orbit, this osteoma was one solid, continuous growth; but in the ethmoid region it was composed of several nuggets, some of whose faces articulated so perfectly that, literally speaking, a hair could not have passed between them. They resembled the tight overlapping of peanuts in a shell. (In a similar growth, Tauber uses a cauliflower as a comparison.) In the operation, the result of this articulation was that when a part of one face was bitten off, the combination was unlocked with liberation of the remainder of that portion. These peculiarities of growth seem proof—to the author, at least—that this multiple osteoma had several foci, which were, possibly, the frontal sinus, the junction of the frontal and ethmoid, the ethmoid, and the turbinates—and that all these different simultaneous growths were finally jammed and moulded together.

3. Etiology.—This growth certainly covered a period of ten years and probably a much longer one. In a histologic report which Dr. Jonathan Wright* was kind enough to make on slides of the osteomatous bone from the first operation, he states that the Haversian canals were markedly enlarged with a proliferation in them of an embryonic connective tissue or perhaps the remnants of the processes of the giant bone cells. It is probable that this osteoma found its origin, as many authors believe, in some embryonic growth-fault in the fronto-ethmoidal region. But one may ask, what irritation caused so excessive a production and formation? It is impossible to

*Dr. Wright's opinion was given on slides from sections of the first operation, before the autopsy report had been made. He inclined to the opinion that the growth was an osteosarcoma, without, however, ruling out the possibility of osteoma with syphilis.

determine whether the sinusitis of many years' standing had antedated the osteoma and acted as a stimulant for its growth, although that is a distinct possibility. It may be said, however, with very great certainty, that the osteomatous condition, if not secondary to the syphilis, was greatly aggravated by the acquisition of syphilis.

4. The necessity for early treatment cannot be too strongly stated. Reports of similar cases show that so good a subject as the patient had every chance of recovery if the operation had been performed before the growth had invaded the cranium.

5. Although at autopsy an abscess was found in each frontal lobe, no sign or symptom referable to them had presented at any time during the patient's life with the possible exception of the last few days.

6. This case, in which the patient enjoyed extraordinarily good health, nevertheless revealed sinusitis and syphilis, both of long duration. As the literature shows a good many cases in which, because of the patient's excellent health, no Wassermann was taken, the present writer would like to urge that no means of examination be left untried for patients in whom an osteoma of the nasal accessory sinuses is detected.

BIBLIOGRAPHY.

1. Andrews, J. A.: Successful Removal of Two Osteomata of the Orbit; One Originating in the Frontal, the Other in the Ethmoid Cells, *Med. Rec.*, 1887, XXXII, 261.
2. Gützer, J. H.: Nasal Osteoma; Report of Case; Operation, *Med. Rec.*, 1910, LXXVIII, 12.
3. Knapp, H.: The Exostoses of the Frontal Sinus, *Trans. Med. Soc. St. N. Y.*, 1881, 244.
4. Knapp: A Case of Ivory Exostosis of the Ethmoid Cells, *Arch. Otol.*, 1884, XIII, 51.
5. Fridenberg, P.: Orbital Osteoma of Ethmoid Origin; Perforation of Orbital Roof and Exposure of Frontal Lobe—Operation—Recovery, *Trans. Am. Ophth. Soc.*, 1903, X, 83.
6. Van Wagenen, C. D.: Postoperative Double Frontal Sinuitis, Extensive Osteoma of Frontal and Nasal Bones and Orbital Fossa, with Superimposed Lipoma, Causal Factor, Frambesia (Yaws), *Laryngoscope*, 1911, XXI, 643.
7. Chapman, V. A.: Osteoma of the Frontal Sinus, *Jr. Mich. St. Med. Soc.*, 1916, XV, 18.
8. Barnhill, J. F.: Unusual Case of Large Osteoma of Frontal Sinus, with Complications, read at the Cong. Am. Laryngol. Ass., 1918. (To be published shortly.)

9. Mott, H. B.: Case of Exostosis Occupying the Orbit and Nasal Cavity, *Am. J. M. Sc.*, 1857, XXXIII, 35.
10. Jackson, E.: Osteoma of the Orbit. *Jr. Am. M. Ass.*, 1892, XIX, 299.
11. Lewis, F. N.: Osteoma of the Orbit, *Med. Rec.*, 1893, XLIII, 654.
12. Pooley, T. R.: The Removal of a Large Exostosis of the Orbit, *Trans. Am. Ophth. Soc.*, 1890, V, 611.
13. Sattler, R.: Ivory Exostoses of the Orbit, *Trans. Am. Ophth. Soc.*, 1896, VII, 553.
Sattler, R.: Supplementary Report, *ibid.*, 1897, VIII, 70.
Exstosis of the Orbit and Frontal Sinus, *Cincin. Lancet-Clinic.* 1897, XXXVIII, 137. vX
14. Sattler, R.: A Cast of Unilateral Proptosis, etc., *Arch. Ophth.*, 1918, XLVI, 168.
15. Norris, W. F.: An Ivory Etostosis of the Orbit, *Tr. Am. Ophth. Soc.*, 1897, VIII, 67.
16. Veasey, C. A.: Unusually Large Osteoma of Frontal, Ethmoidal and Sphenoidal Sinuses Involving Orbit and Anterior Cerebral Fossa, *Ann. Ophth.*, 1916, XXV, 699.
17. Probert, C. C.: Osteoma of the Frontal Sinus, *Jr. Mich. St. Med. Soc.*, 1916 XV, 304.
18. Coffin, L. A.: Osteoma of the Ethmoid, *Laryngoscope*, 1917, XXVII, 525.
19. Adamük: Three cases of Bony Orbital Tumors, *Arch. Ophth.*, 1890, XIX, 243.
20. Bornhaupt, T.: Ein Fall von linksseitigem Stirnhöhlen Osteom, *Arch. klin. Chir.*, 1881, XXVI, 589.
21. Haas, E.: Ueber die Osteome der Nasenhöhle, *Beitr. klin. Chir.*, 1901, XXXI, 139.
22. Gerber, P. H.: Les Ostéomes du sinus frontal, *Arch. internat. de lar.-otol.-rhinol.*, 1907, XXIII, 17.
23. Taranto, I. M. de: Les Ostéomes de l'orbite (Thesis), Paris, 1901.
24. Boenninghaus: Die Operationen an den Nebenhöhlen der Nase, *Handb. d. spez. Chir. d. Ohres u. oberen Luftwege*, 2nd Ed. Wursburg, 1914, III, 234.
25. Hilton: Case of Large Tumor in Face, *Guy's Hosp. Reports*, Lond., 1836, I, 493.
26. Paget, Sir J.: *Lectures on Surgical Pathology*, Lond., 1853, II, 234.
27. Tweedy, J.: On a Case of Large Orbital and Intracranial Ivory Exostosis, *Royal Lond. Ophth. Hosp. Reports*, 1880-82, XIII, 303.
28. Grossman, K.: An Ivory Exostosis of the Orbit Removed by Drilling, *Ophthal. Rev.*, 1887, VI, 341.
29. Pfeiffer, W.: Ein Fall von Osteome und Mukokele des Sinus frontales mit Perforation der Zenbralenwand, *Zeit. Ohrenh.*, 1912, LXII, 223.
30. Virchow: *Die Krankhaften Geschwülste*, Berlin, 1864-65, II.
31. Dolbeau: *Mémoire sur les Exostoses du sinus frontal*, Paris, 1871.
32. Rokitsansky, C.: *Handb. d. path. Anat.*, Wien, 1844, II, 210.

33. Arnold, J.: Zwei Osteome der Stirnhöhlen Virchow's Arch. path. Anat., 1873, LVII, 145.
34. Tillmans, H.: Ueber todte Osteome der Nasen und Stirnhöhle, Arch. klin. Chir., 1885, XXXII, 677.
35. Cruveilhier, J.: Traité d'anatomie pathologique, Paris, 1856, III, 871.
36. Hucklenbroich, P.: Über einen Fall von Osteom nebst Mucocoele der Stirnhöhle, Inag.-diss., Freiburg, 1905.
37. Mitvalsky: Recherches sur les tumeurs osseuses de la région orbitaire, Arch. d'opht., 1894, XIV, 593.
38. Coppez, H.: Six cas d'ostéomes du sinus frontal. Arch. d'opht., 1895, XV, 279.
39. Tauber A. S.: Über Stirnhöhlenosteome, chirurgia, 1898, III, 41 (Moscow). Ref. Centralbl. Chir., 1898, XXV, 775.
40. Zimmerman, H.: Ein Osteom des Sinus frontalis, Deut. Zeit. Chir., 1900, LVII, 354.
41. Witzheller J.: Über einen Fall von spongiösem Osteom der Stirnbeinhöhle, Inag.-diss., Greifswald, 1900.
42. Knapp, H.: Beschreibung eines Fall von elfenbeiner Orbitalexostose, Arch. Ophthal., 1861, VIII, 239.
43. Leonte: Osteom eburnat al fose, nasale drepte, Spitalul, Bucuresci, 1893, XIII, 81.
44. Dubar, E.: Des Ostéomes des fosses nasales et des sinus voisins (Thesis), Paris, 1900.
45. Miodowski, F.: Knöcheron Orbital Tumoren. Inag.-diss., Breslau, 1900.
46. Citelli, S.: Gros ostéome primitif du sinus frontal. Ann. d. mal. d'oreille, du larynx, etc., 1918, XXXIX, 483.

LXII.

CASE OF PLASTIC REPAIR OF THE ALA OF THE NOSE, BY MEANS OF DOUBLY EPITHELIALIZED FLAP FROM FACE.

BY ROBERT H. IVY, M. D., MAJOR, M. C.,

WASHINGTON.

Through the courtesy of Major J. H. Bryan, of the Walter Reed General Hospital, I was asked to see the following case:

Sergeant F. A. H., Medical Department, age twenty-four years, on May 2, 1918, was thrown from the side car of a motorcycle and received a severe laceration of the nose and face, which was immediately sutured. The entire right ala of the nose was torn away.

June 1, 1918. Examination on admission to the Walter Reed General Hospital shows a scar on right side of face, extending from about the center of the upper lip upward, outward and then downward to a point about two inches in front of the right angle of the jaw. The right ala of the nose is gone, leaving the septum exposed on this side. (Figures 1 and 2.)

At the suggestion of Lt. Col. Harris P. Mosher, it was decided to attempt to replace the lost ala by turning a pedicled flap from the face, after first epithelializing the under surface of the flap by the method of Esser (*Annals of Surgery*, 1917, LXV, 297.)

June 19, 1918. Under 1 per cent novocain-adrenalin anesthesia a flap was cut from the region between the nose and the right cheek, with pedicle at outer angle of right nostril, and tip near the inner angle of the eye (Figure 3). A thin piece of dental modeling composition was moulded to the shape of the flap, covered on both sides with a Thiersch skin graft with raw surface out, taken from the inner side of the left arm, and inserted beneath the flap. The flap was sutured back in its original position with the Thiersch covered modeling composition under it, to allow the Thiersch to take and



Figure 1.



Figure 2.

thus epithelialize both the raw under surface of the flap and the raw surface remaining at the original site of the flap.

One June 27, 1918, eight days after the first operation, the sutures were removed, the modeling composition was taken out, and it was found that the Thiersch had grown very well to both raw surfaces, and that there was a thick, well nourished, doubly epithelialized flap for transplantation. Under novocain anesthesia the margin of the ala defect was freshened, the flap was turned down at right angles to its former



Figure 3.

direction, trimmed to fit the defect, and sutured in its new position with horsehair, in such a manner that the Thiersch-covered surface replaced the mucous membrane side of the ala. A hard rubber tube was placed in the right side of the nose for a few days.

July 15, 1918. A slight notch existed near the tip of the nose, owing to the flap being a little too short. The edges of this notch were freshened and brought together with horsehair sutures.

The results after these operations were fairly satisfactory, as shown by Figures 4, 5 and 6. The lower edge of the flap was too straight and the new ala did not have the normal rounded prominence. The size of opening of the



Figure 4.

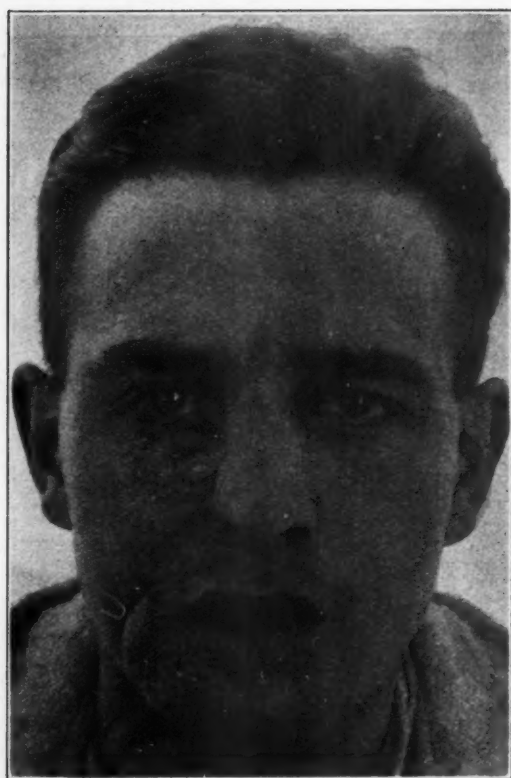


Figure 5.



Figure 6.

nostril compared favorably with that of the sound side, and breathing was in no way interfered with.

July 22, 1918, an endeavor was made to build out the ala somewhat and to eliminate a crease in its lower border by making a pocket under the skin and inserting three small pieces of septal cartilage. The wound healed without trouble and there was some further improvement in the appearance.

The reason for reporting this case is that, so far as can be discovered, it is the first to be recorded in this country in which the doubly epithelialized flap method of Esser was used to repair the ala of the nose. The difficulty of obtaining a passable cosmetic result and of preserving the full patency of the nostril by the ordinary flap methods is well known. The results obtained in this case encourage one to believe that a satisfactory way of dealing with this problem has been found.

LXIII.

SOME ORIGINAL METHODS OF TREATMENT OF LARYNGEAL STENOSIS.

BY SAMUEL IGLAUER, B. S., M. D., CAPTAIN, M. C.,

CINCINNATI.

In this paper it is my purpose to describe some methods of treatment which I have employed to advantage in cases of chronic laryngeal stenosis. These methods are only applicable with patients wearing a tracheal canula, or in cases in which it was deemed best to perform a tracheotomy as part of the treatment. In addition there must be a real or a potential passage through the larynx to the tracheal fistula.

1. Dilatation by Means of a Rubber Tube Doubled Upon Itself.—This procedure is based upon the well known effect of the continuous elastic pressure of rubber tubing in promoting the resorption of cicatricial tissue. It follows the same principle which underlies the use of rubber tubes in laryngotomy, but has the advantage of being employed without the necessity of splitting the larynx.

The technic is as follows: A stout silk cord (A, Figure 1), about eight inches long, is firmly tied about the center of a piece of soft rubber tubing (B) of a diameter to suit the case. The tubing is then doubled upon itself and the free ends are firmly tied together with a second cord (C). The length of the tube, when doubled, should approximate as nearly as possible, the distance from the arytenoids to the upper margin of the tracheotomy. The spring wire taken from a Bellocq canula (or some similar appliance, such as a grooved director perforated at the tip) is threaded with a cord in the usual manner. The tracheal canula having been removed, the wire is introduced through the tracheotomy opening until it presents in the mouth (mouth gag), when the cord it carries is pulled out of the mouth. The wire is then withdrawn from below, leaving the lower end of the cord protruding from the

neck. In old tracheotomies, if any difficulty is encountered in passing the wire toward the mouth, it is best to incise the upper margin of the tracheal opening under local anesthesia.

The oral end of the cord is now tied to the free end of the string (A), and traction is then made downward upon the tracheal end of the cord, drawing the rubber tube into the larynx until its folded end presents at the upper margin of the tracheal fistula (Figure 2). At the same time counter traction is made upon the string (C) to prevent the tube from being drawn too far into the trachea. The tracheal canula is now reintroduced and the string protruding from the trachea is wrapped (clockwise) about the stem of the canula and is then fastened to the patient's neck with adhesive plaster. This is important, since it prevents the rubber tube from gliding past the tracheal canula. The string (C) is allowed to protrude from the patient's mouth (and fastened to the cheek with adhesive plaster), to serve as an extractor when the tubing is to be changed. Otherwise the tubing may be removed by depressing the patient's tongue and seizing the tubing with a forceps. Figure 1B shows the doubled tube in place in the larynx. Should the tube project too far into the larynx it may be cut off by depressing the tongue and seizing the projecting ends with a tonsil forceps, over which a snugly fitting tonsil snare is passed, and amputating the protruding ends of the tubing *in situ*.

In addition to the elasticity of the rubber itself, the tubing contains imprisoned air, which exerts pneumatic pressure as well. The tubing should be changed after several days, and larger tubing can be substituted. In making the change it is usually unnecessary to employ the Bellocq canula a second time, because during extraction the tubing draws the long string (A) after it, and this string can then be attached to the next size rubber tube, which is then drawn into place as before.

This procedure has been employed to considerable advantage in the course of treatment of some five patients. In one case with a complete subglottic cicatricial diaphragm, a passage was first made by blunt dissection, with the patient in suspension. Through this passage a single piece of rubber tubing was first drawn and allowed to remain. In a short

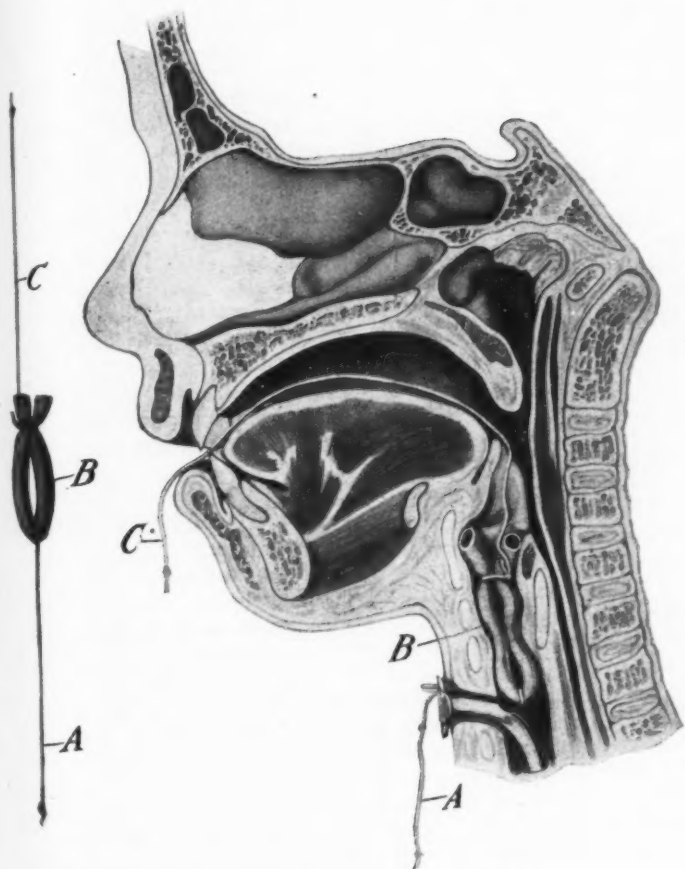


Fig. 1.

Fig. 2.

time this could be supplanted by the double tubing. The advantage of continuous elastic pressure without laryngostomy has already been mentioned. The chief objection to the method lies in the impossibility of oronasal breathing with the tubing in place.

Insertion of a Single Rubber Tube From Below.—Oral breathing can later be reestablished by the following modification of the procedure described above. A piece of rubber tubing of proper length and diameter is selected. A draw string is attached to each end of the tubing and one of the strings is then passed from below into the mouth, drawing the tubing into the larynx. The tracheal canula is reinserted and the tracheal string is then anchored to the plate of the tracheotomy tube, as in laryngostomy.

As soon as the stenosis has become somewhat dilated, oral breathing may also be partly reestablished by introducing a short intubation tube above the tracheal canula. In some cases of laryngeal stenosis, however, it is exceedingly difficult or even impossible to introduce an intubation tube in the usual manner. Under these circumstances, the following method may be employed.

INTUBATION BY TRACTION.

Two small holes (B. B., Figure 3) are bored into the lower end of an intubation tube, one on its anterior surface and the second directly opposite on the posterior surface of the tube (A). A stout silk cord (C) about eighteen inches long is then passed through both these openings in the intubation tube and the ends of the cord are tied together and are allowed to hang from the lower end of the tube. In addition, the head of the intubation tube should always be threaded in the usual manner (E). The tracheal canula is then removed and, as described above, a string about a foot long is now introduced through the tracheotomy opening until it presents in the mouth. The string (C), previously attached to the lower end of the intubation tube, is now tied to the oral end of the string. Traction from below is then made on the tracheal end of the string and, with a guiding finger in the larynx, the intubation tube is drawn into place. The tracheal canula is now replaced, and the string (C) protruding from the neck is fastened to the neck with adhesive plaster.

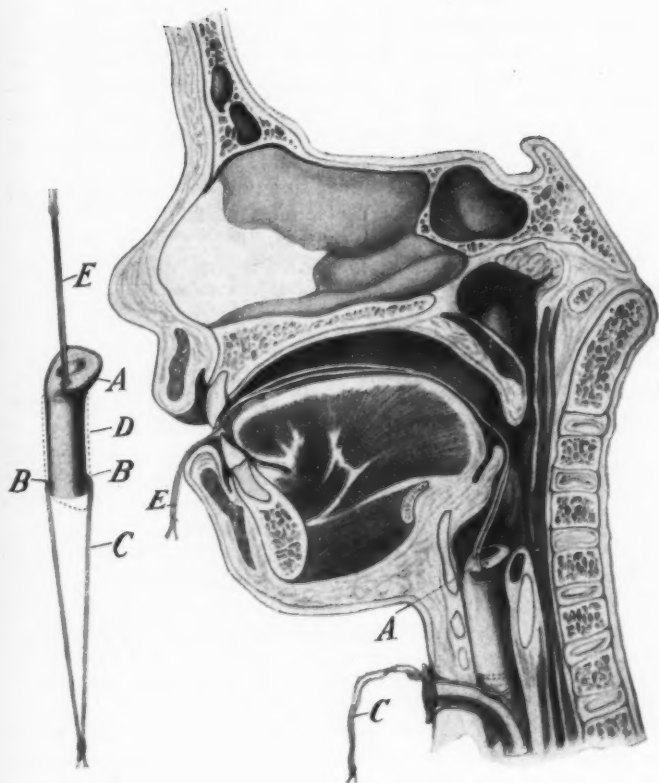


Fig. 3.

Fig. 4.

Following a suggestion by Dr. Lynah, the diameter of the intubation tube may be increased at will by stretching rubber tubing (D) (Figure 3) over the intubation tube. When thus covered, the traction string is then threaded through both the rubber covering and intubation tube at the same time. The rubber covering exerts continuous elastic pressure on the stricture. By allowing the rubber tubing to project slightly beyond the lower end of the intubation tube posteriorly the angle between the intubation and tracheotomy tubes is obliterated, preventing the formation of a spur in the trachea at this point.

Figure 4 shows the intubation tube in situ, with the strings (C and E) attached. In performing intubation by traction the technic, as described above, should be closely followed, since one can exert considerable force by this method. In one case when I neglected to pass the string C through both the lower openings in the tube, the lower lip of the tube caught in the posterior wall of the larynx and made a false passage into the esophagus. Fortunately, the patient made a functional recovery from this accident. Otherwise no bad effects have resulted from the employment of this method.

In the final treatment of these cases the tracheal canula should be left out and clamped Rogers or Lynah intubation tubes may be employed. Spontaneous extubation may also be prevented by employing the anchor string method of fixation which I have described in former publications.¹ According to this method, a long silk thread is tied into an annular groove in the intubation tube. After intubation the thread is drawn through the tracheotomy fistula and fastened to the skin with adhesive plaster.

1. *Lancet Clinic*, October 11, 1913.

Laryngoscope, August, 1916.

LIVINGSTON BUILDING.

LXIV.

REPORT OF A CASE OF OSTEOMA OF THE FRONTAL SINUS OF LARGE SIZE. OPER- ATION; RECOVERY.

BY JOHN F. BARNHILL, M. D.,

INDIANAPOLIS.

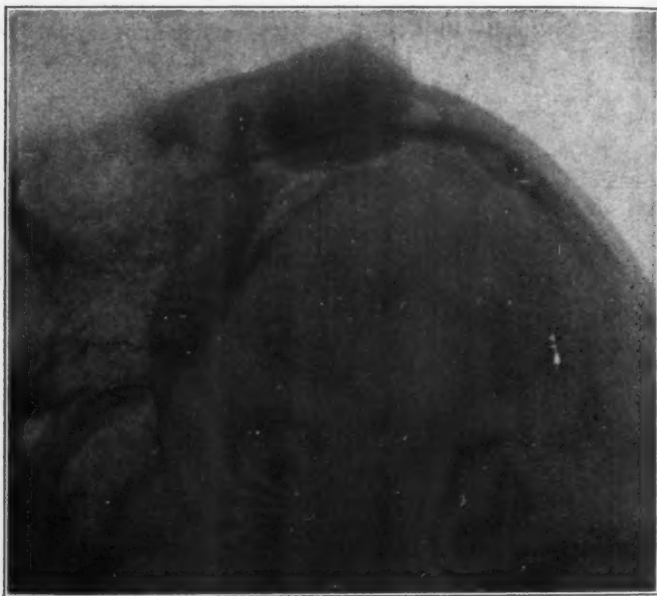
The patient, referred by Dr. J. D. Mochelle, a high school girl, sixteen years of age, had never had any previous illness. Her family history was good. At the time of examination she was of medium size and vigorous appearance. There was no evidence of tubercle or lues. No nose or throat ailment of any kind, and no complaint whatever except of a deformity of the forehead. She stated that while in school one day a year previously she noticed a slightly raised place on the forehead, which was large enough to be felt but not seen. This grew gradually until now, when the deformity is quite marked. There never was any pain about the forehead, nose or eyes. No bleeding from the nose had ever occurred.

On palpation, the bulging tumor on the forehead felt very hard. The skin covering it was thin but not adherent or inflamed. There was no crepitus. The eyes were straight and vision normal. An X-ray examination showed the tumor in the frontal sinus with apparent absorption of the anterior and posterior antral walls. (Figure.)

The operation was performed at the Methodist Hospital after the usual preparations, under careful aseptic technic. The usual incision for opening the frontal sinus was made, with the addition of a perpendicular cut upward in exactly the center line of the forehead, to give better access. The white glistening tumor lay under the periosteum, the anterior wall of the osseous sinus having been absorbed over a considerable area. With rongeurs the balance of the anterior bony wall of the sinus was removed, when the tumor was pried out with stout bone elevators, leaving its bed with a sharp, cracking sound. The ivory-like growth was smooth,

ovoid and somewhat of the density of a billiard ball. It was attached at the infundibulum, into which a branch extended which fractured at removal. There was, apparently, no point of attachment or adhesion to any other part of the antrum.

The posterior portion of the antral wall was absorbed over a wide area, and the dura correspondingly exposed, but was not adherent to the tumor, and was not inflamed or eroded.



The infundibulum was enlarged for better drainage, the flaps were stitched in place and gauze and bandage applied. Recovery occurred in a few days, with almost no scar or deformity. The young lady is in good health and no appearance of a return of the growth after one year.

The tumor, which weighed 600 grains, seems undoubtedly an osteoma. At this age we must not, of course, overlook the possibility of sarcoma. No symptom of sarcoma could be obtained.

LXV.

REPORT OF A CASE OF MENINGITIS FOLLOWING
OPERATION UPON THE MIDDLE TURBINATE,
WITH AUTOPSY FINDINGS SHOWING AN
OLD PERFORATION OF THE CRIBRI-
FORM PLATE OF THE ETHMOID.

BY THOMAS J. HARRIS, M. D., LIEUT.-COL., M. C.

NEW YORK.

Meningitis of nasal origin, following operation or independent of it, in comparison with the number of such cases following suppurative affections of the ear, is a rare occurrence. The subject has been treated in recent years by Coffin, Killian and Dabney, among others.

Meningitis, dependent upon operative work confined to the middle turbinate, is still more rare, and the total number of cases reported is very small. During the past spring such a case occurred in the otolaryngologic service of the U. S. Army General Hospital at Fort Oglethorpe, and offers so many unusual points of interest that it is deemed worthy of being reported.

The patient was a young student officer who was first seen May 29, 1918. He was to all appearances a healthy man of twenty-six or twenty-seven years. He gave a history that a number of years ago he had sustained a fracture of his nose in the course of a football game. This incapacitated him for two weeks, since which time, twelve or more years ago, his nose had given him no trouble. In the course of a routine examination of the nose and throat, an obstructing growth in the right nostril was discovered. When his attention was directed to it, he admitted that the breathing on that side was considerably obstructed. He made no complaint of headaches and there were no signs of disease of the accessory sinuses. Examination of the nose showed a large mass, having its origin

apparently in the middle meatus, of sufficient size to interfere decidedly with respiration. It gave at first the appearance of an ordinary nasal polyp. More careful examination showed it to be the middle turbinate which had undergone cystic degeneration. Palpation with a probe gave the sensation of semi-density. The inferior turbinate was decidedly atrophic. The cyst under strict aseptic precautions was aspirated and a

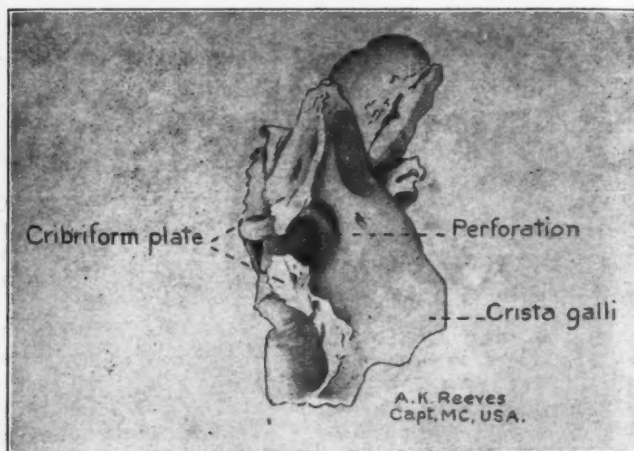


Fig. 1.—Drawing $\frac{3}{4}$ inch larger than specimen. Scale of enlargement $1\frac{1}{2}$ times, showing perforation in cribriform plate of ethmoid.

small quantity of clear fluid was withdrawn. This was sent to the laboratory for examination. The sensation of penetrating a thin but resisting wall was met with in the introduction of the needle.

The patient was seen the following day and had experienced no unpleasant results from the examination. The report of the laboratory of the cyst's contents was negative. Removal of the cystic turbinate was recommended and agreed to.

The patient was admitted to the hospital Monday, June 3d, and was operated upon the same day. Extreme care was

exercised so far as asepsis was concerned. Local anesthesia (application of 20 per cent solution of cocain by packing) was employed. The duration of the operation was from two to three minutes. The turbinate was removed with a cold wire snare. There was no bleeding or pain in connection with the operation. In the absence of all symptoms, no operation was performed upon the ethmoid or other accessory sinuses. Packing in the lower part of the nose was introduced. Following the operation, the patient remained in the hospital for three days. Convalescence was uneventful; there were no after symptoms, no headache, no fever, no discharge. The patient was dismissed from the hospital the third day with instructions to report the following day for examination. He was seen the following day. His nose was in perfect condition, subjectively and objectively. No treatment was given. He was again seen Saturday, June 7th, and was feeling perfectly well. A slight bleeding from the operated side of the nose had taken place, which the patient ascribed to an examination at the infirmary. A small spot, regarded by him as the cause of the bleeding, had been touched with a solution of nitrate of silver by Capt. Pate. Examination showed the nose virtually well. The patient was discharged with the request to report the middle of the following week for final examination.

Sunday, June 8th, he was seen in his quarters about eight o'clock, complaining that he had been suffering from headache all night. It was learned that the previous afternoon he had attended a baseball game. At four o'clock he vomited. He was aroused with some difficulty and was clearly very sick. He was ordered to the hospital without delay.

A spinal puncture was performed, showing a decidedly cloudy fluid. There was a positive Kernig. A diagnosis of meningitis was made. He became rapidly more comatose until, when seen at two o'clock, he was in deep coma. He died without regaining consciousness, Monday night at 10:30 o'clock. An X-ray picture taken Saturday, June 7th, showed complete absence of both frontal sinuses and granulations in the right ethmoid.

An autopsy was performed by Major Keilty, whose report is as follows:

Cause of death: Meningitis, cerebrospinal; acute fibrinopurulent, pneumococcic. Contributory: Cystic degeneration of the middle turbinate with operation, complicated by failure formation of the cribriform plate of the right ethmoid bone.

Bacteriologic diagnosis: Pneumococcus.

Description: The body is that of an adult white male, about twenty-eight years of age, well nourished and well

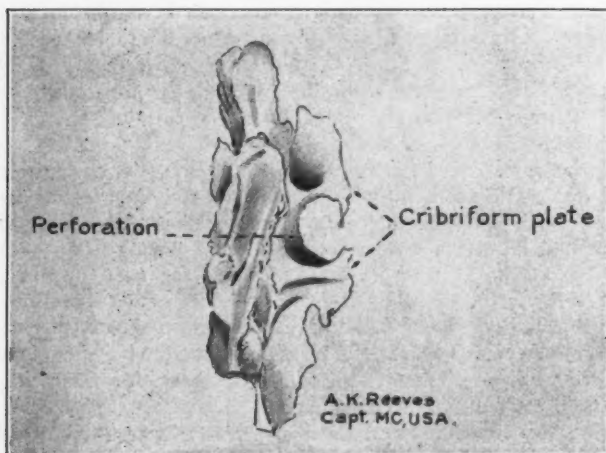


Fig. 2.—Anterior view. Drawing $\frac{3}{4}$ inch larger than specimen. Scale of enlargement $1\frac{1}{2}$ times, showing perforation in cribriform plate of ethmoid.

developed. Postmortem vigor is moderate and postmortem livor is present in the dependent positions. The chest and abdomen were not opened. There was an old scar over the right lower quadrant of the belly wall perfectly healed and tight.

The brain: The skull was opened by the usual incision. Upon lifting off the calvarium, a profuse exudate was noted over the convex surfaces of the cerebrum, more marked on the right side than on the left. The exudate occupied the subdural and pia arachnoid spaces and was more of the fibrinous than purulent character. This follows the usual

course of an exudate developed by this type of pneumococcus with chemotropic repellant action. The exudate was quite extensive over the entire brain, the base as well, and quite blocked up the cisterna magna. The smaller capillaries of the pia were extremely congested and in places showed small hemorrhagic areas.

The spinal cord was not removed, but the exudative process extended along the cord below the pons.

In removing the brain, it was noted that the anterior lobe of the cerebrum was adherent to the cribriform plate of the ethmoid on the right side. Some of the brain structure was torn during the removal. This would indicate that at least part of the process at this point was chronic. In the middle portion of this cribriform plate, just to the right of the crista Galli, an opening was found about five millimeters in diameter with a necrotic center. This necrosis included the dural covering. It was possible to pass a pair of forceps straight through into the nasal cavity. Thus a direct communication was established between the ethmoid sinus and dural space. Upon stripping the dura, the opening in the bone was found to be perfectly smooth and regular and without reaction. The bone about the hole in the plate on this side was compressed into a decided fossa as compared with the left side. After removal of the plate, the underlying ethmoid cells were found as a mass of necrotic material attached to the plate above and opening into the nose pharynx below.

The nature of the opening in the cribriform plate has several possibilities. The regular and smooth appearance associated with depression suggests a possibility of a developmental fault. On the other hand, the necrotic character of the ethmoid cells strongly suggests an extension of the inflammation as an otitis. The history of an old fracture the nose is in favor of the latter conclusion.

Bacteriologic studies on the exudate show the infecting organism as pneumococcus.

A smear was taken from the nose at the time of the operation and showed many gram negative and gram positive diplococci.

Specimen from spinal fluid showed pneumococci type II (atypical).

Specimen from autopsy showed pneumococci type II (atypical).

The tissue removed from the nose was submitted to Major Keilty for examination. His report follows herewith:

Gross: The tissue submitted consists of a small mass of mucosa and submucosal tissue.

Microscopic: Three blocks of tissue were cut. The sections showed the mucosa and submucosa the seat of an intense inflammatory process. In some places the modified epidermal layer has been loose, as if by ulceration. The blood vessels are decidedly congested, and the lymph spaces are filled with an exudate material fibrin. The cellular exudate was made up of polymorphonuclear leucocytes with large numbers of plasma cells. In addition to the acute process, there is evidence of an old chronic inflammatory lesion as evidenced by heavy strands of connective tissue in the submucosal position.

The diagnosis is based on the tissue as submitted.

Diagnosis: Rhinitis, acute phlegmonous superimposed upon. Rhinitis, chronic hypertrophic.

Comment.—There is little question that the perforation in the plate had existed since the time of the injury to the nose twelve years before. In spite of the absence of symptoms, there was clearly present an old ethmoiditis, latent in character, associated with a latent meningitis. There was probably a direct communication between the cystic turbinate and the brain. As was stated by one of the surgeons who saw the case, the slightest shock was sufficient to light up the inflammation. The operation, slight as it was, served as the exciting cause.

A case quite similar in nature has recently been seen at Camp Lee, in the service of Major E. W. Day, who kindly communicated the chief facts in the case. It was a case of chronic ethmoiditis, with polyps, pus and headache. The polyps were removed and an attempt was made to discover ethmoid cells without success. Meningitis developed in the course of a week, with death. The postmortem showed an old necrotic cribriform plate and a probable localized meningitis existing before the operation. In the opinion of Major

Day, the operation had broken down the walled-off area and allowed it to become general.

In addition to the case of Day and our own case, the following report on deaths due to meningitis of nasal origin, appears in an article by Dabney, entitled "Deaths Attributable to Intranasal Operations and Other Instrumentation," in the *Annals of Surg., Gyn. and Obst.*, 1916.

DEATHS FROM TURBINATE OPERATIONS.

"1. Removal of the inferior turbinate resulted in death in Gregory's case, though the autopsy showed a fractured ethmoid cell which might have caused the terminal meningitis.

2. Kümmel's case died from the result of a tear in the dura and the fracture of the cribriform plate, apparently caused by the removal some time before of the middle turbinate. The injuries were not discovered until after the death from what was suspected to be an acute frontal sinus abscess. The autopsy revealed the basic trouble and cause of the cranial involvement.

3. The danger of removing the entire middle turbinate in acute frontal sinusitis without first trying ordinary irrigation, is illustrated by the death in the practice of a colleague of this city. The advanced age of the patient made her an especially bad risk, but the ethmoid disease under the middle turbinate soon flared up into an acute inflammatory process, and she died in four days from meningitis. There was an external opening made into the frontal sinus, but the operation on the turbinate caused the trouble.

4. The resection of the anterior end of the middle turbinate caused a meningeal death in Merlsei's case as reported by Boenninghaus.

5 and 6. The classic cases of Quinlan and Wagner, each of whom lost a case from galvanocauterization of the middle turbinate, are well known.

7 and 8. Rethi, however, adds to the records a case of Lange and another of Lublinski, dead from the same cause—meningitis following galvanocauterization of the middle turbinate.

9. My own case was particularly unfortunate, as it was an operation of choice and one in which there was so little done under ether. The right inferior turbinate was resected only to the extent of the inferior edge, about one-third of the bone being removed anteroposteriorly. In addition, with the forceps, the remains of the adenoid tissue were removed. He took the ether very badly and never regained consciousness after its administration, passing into violent convulsions the next morning and later lapsing into coma, dying the third day from cerebrospinal meningitis. A few moments after death a thin stream of cerebrospinal fluid trickled down the upper lip, having escaped from the cribriform plate on the side operated upon. That the patient should never have come out of the ether but passed insensibly into the unconsciousness of meningeal infection, and that this infection should have followed so insignificant an operation as indicated, strongly suggests that the patient already had a latent meningitis at operation."

These make in all, with my own case and that of Day's, eleven cases of meningitis following operative work upon the middle turbinate. Of these, cases 5 and 6, 7 and 8 followed the use of galvanocautery upon the middle turbinate, and so may be dismissed from the total number. Of the remaining seven cases, the one reported by Dabney followed an operation upon the inferior turbinate. There is little question; however, that it was the middle turbinate that was injured, producing the meningitis. It would appear in this case that there must have been a fracture of the cribriform plate at the time of the operation, with the probability of a latent meningitis.

The unfortunate results in all of these cases were unavoidable. Considering the countless operations performed upon the middle turbinate without serious consequences, the few fatalities here noted can only be explained by abnormal conditions existing at the time of the operation. In the case of Dabney and myself, there was unquestionably present an old perforation of the cribriform plate. Such a fracture was entirely impossible of discovery in advance of the operation. This forces upon one the unavoidable conclusion that in every case most extreme care should be taken at the time of the operation upon the middle turbinate.

REFERENCES (DABNEY'S ARTICLE).

1. Kümmel: Verhandlungen des Vereins Deutscher Laryngologen XX.
2. Boenninghaus: Handbuch des Speciellen Chirurgie des Ohres und der Obren Luftwege Katz, Preysing and Blumenfeld, 1911, 111, 203.
3. Quinlan, F. J.: A Case of Electrocauterization of the Middle Turbinate Bone Followed by Meningitis. J. Resp. Org., 1890, June.
4. Wagner, R.: Erkrankungen des Hirns nach einfachen Nasenoperationen. Münch. Med. Wehnschr., 1891, No. 51.
5. Rethi, L. Neble: Zufalls nach Nasenoperationen, Arch. F. Laryngol., 1896, IV, 403.
6. Gregory, H. L.: A case of Acute Cerebrospinal Meningitis of Nasal Origin. J. Laryngol., Etc., 1912, October.

LXVI.

CHANGING METHODS AND ADVANCES IN THE
TREATMENT OF PROGRESSIVE DEAFNESS
FOLLOWING CHRONIC HYPERPLASTIC
OTITIS MEDIA.

(SECOND COMMUNICATION.)

BY FRANCIS P. EMERSON, M. D., MAJOR M. C.,

BOSTON.

In the etiology of chronic secretory—exudative—catarrhal or hyperplastic otitis media, aurists are in accord as to the pathology and necessary treatment of the eustachian tube and middle ear, but there is still a wide diversity of opinion in regard to the conditions that have preceded the chronic state and as to what steps are necessary to arrest or improve a disease that affects the majority of our office clientele. If we consult our latest textbooks we find that adenoids are mentioned as first in the list of causes, and here, especially in children, there would be no controversy. The second (to still quote from the latest textbook), recurrent attacks of subacute catarrhal otitis media, in which resolution is never quite complete, is given as a cause. Third, frequent attacks of acute rhinitis, each attack giving rise to more or less tubotympanic congestion. Fourth, obstructive nasopharyngeal lesions resulting in chronic tubal catarrh which later involves the tympanum. The writer would respectfully submit as a substitute for these subdivisions, except the first as a primary cause, the result of early infections usually the sequelæ following the infectious diseases and la grippe. These diseases leave a streptococcus focus which becomes chronic and is indefinitely subject to acute exacerbations, causing recurrent attacks of subacute catarrhal otitis media, frequent attacks of what seem to be acute rhinitis, yet are not fresh infections, but the lighting up of this chronic focus, and lastly making obstructive nasopharyngeal lesions potential factors in deafness only

because the impaired drainage keeps up the chronic infection. In taking the histories of these chronic cases one is impressed with the fact that these patients have had various manifestations of the same infection, dating back to an attack of diphtheria, measles, scarlet fever or la grippe. These infections have resulted in secondary involvement of the lymphatic or osseous tissues, such focal processes being subject to acute exacerbations, but existing as a low grade process in the interval. These exacerbations are so constant that it is a question whether acute infections ever take place in a normal nasopharynx. The writer confesses that in late years he has not been able to make a differential diagnosis between otitis catarrhalis adhesiva and the hyperplastic catarrhs from the viewpoint of etiology. Many cases showing but little evidence of secretory changes in the membrana tympani with the nasopharynx clean and no thickening of the mucous membrane have had a definite chronic focus in the throat. In these cases the writer formerly relied upon the hearing test for a diagnosis. He now believes all of them to be due to a toxin, and any differential diagnosis should be based on the tissue reaction in the tympanum rather than upon any difference in origin. Some of the cases here cited show the final stage of a hyperplastic process where the hypertrophic changes have been succeeded by secondary atrophy and nerve degeneration after a steady progression from the throat or nasopharynx to the eustachian tube, tympanum and inner ear. Many other cases with apparently the same etiology are followed by extreme deafness, showing toxic nerve changes that seem to have been caused by absorption directly through the lymphatics or blood streams. The toxic focus that caused the nerve changes in the inner ear probably accounts for the intestinal toxemia referred to by Stucky and other writers.

May 28, 1917. E. J. P., born Rhode Island, forty-five years old; married; merchant.

Past History.—Diphtheria; measles; scarlet fever. No aural history in childhood. Rheumatism seven years ago. Laid up six to seven weeks. Acute infections in the head constantly. In 1901 had la grippe, and lost the hearing in the right ear gradually. No history of discharge. Tinnitus with bad weather. Hearing varies with climatic conditions. Not

so good when tired. History of operation in left nose twenty years ago. Never been right since.

Examination: Nares.—Left, posterior spur and synechia almost closing the posterior naris. Contact with posterior end of inferior turbinate. Cryptic tonsillar disease. Central adenoid. Both eustachian tubes obstructed at the isthmus. Right more open at pharyngeal end.

Ears.—A. D., membrana tympani indrawn. Capillaries injected along the manubrium. L. R. gone. Ground glass appearance.

A. S., membrana tympani indrawn. Ground glass appearance. All folks above 512 heard.

R.		L.
1/6/25	W. V.	1/6/25
11"/24"	R512C ²	6"/22"
6"/9"	256C ¹	6"/8"
	+<W	
96	L. L.	96

No alcohol; tobacco moderate; no venereal history.

X-ray of the teeth and sinuses negative.

Operation at Brooks Hospital, May 29, 1917. Synechia removed. Spur removed with saw. Both antra opened. Tonsil and adenoid operation. (Right tonsil contained free pus.)

November 16, 1917. Right eustachian tube. Ducl's electric bougie (constriction thick at isthmus and would admit only the second size Yankauer bougie). Injection along the manubrium disappeared. Tinnitus stopped. Reaction caused return of tinnitus and tube could not be bougied.

December 28, 1917. Right eustachian tube, electrolysis.

February 28, 1918. Both tubes open. Bougied, argyrol, 20 per cent, on cotton applicator. Sinusoidal current (multiplex and slow), using each five minutes in each ear.

The above case shows a hearing test resulting from a toxic focus. As complications we have marked nasal obstruction, lymphoid tissue in the vault, and decided narrowing of both eustachian tubes at the isthmus with diseased tonsils, the free pus in the tonsils being the most important.

Status Praesens.—After treatment for a year his eustachian tubes are open, the tinnitus and feeling of obstruction gone,

but his hearing remains unchanged. He has had one acute infection during the year at the time of a general epidemic.

If we admit that a pyogenic focus can be present throughout life as a streptococcus infection, subject to acute exacerbations, then we must concede that toxemia with subsequent nerve degeneration plays a more important part in nonsuppurative middle ear deafness than we have supposed in the past. From analogy we would expect that the synapses of the auditory pathway that are sensitive to the poisons of quinin, salicylic acid, morphia, alcohol, tobacco, etc., would also be vulnerable to constant toxic absorption from a focal process. Clinically this seems to be so, and also there seems to be a selective action that sometimes involves the cochlear and sometimes the vestibular branch of the auditory nerve.

It is known by all aurists that following a suppurative otitis media the ossicular chain may be broken by necrosis and sloughing, leaving wide gaps in the conducting apparatus, in addition the membrana tympani may be gone and yet the patient may hear very well. Cases of effective otitis media may show calcarious deposits with marked thickening of the whole drum, and yet there may be a fairly good functioning ear. On the other hand, many cases of catarrhal deafness may show but little change in the membrana tympani and yet have considerable loss of hearing, especially in the upper register. Is this due to changes in the conducting apparatus or is it due to beginning auditory nerve degeneration, or to both causes? In the judgment of the writer, it is not necessary to have marked changes in bone conduction, unless it be to raise it in the early stages to have toxic nerve deafness in connection with the evidence of chronic hyperplastic otitis media. In these cases there is often a hearing test that is almost identical on both sides. Represented graphically it would be like the following for a chronic condition.

Malleus movable. Folks above 512 heard faintly or not at all. Tinnitus marked:

R.		L.
Shout	W. V.	Shout
12"/22"	Rinné 512C"	10"/20"
	W>+	
512	L. L.	512

This patient, forty-eight years of age, commenced to be deaf as a girl, following scarlet fever. Diseased tonsils with a low grade pharyngitis and progressive loss of hearing without marked attacks of tonsillitis was the subsequent history. In cases of this type the writer believes that in the hyperplastic stage of catarrhal otitis media mechanical obstructions to the sound waves is an important factor in impairment of hearing. When, however, secondary atrophy has commenced and the infection has extended well into the eustachian tubes as a chronic process, then the effect of toxemia upon the auditory labyrinth or auditory nerves is equally important with extension from the tympanum. Tinnitus, which is only another name for vestibular irritation, has for its exciting cause changes in the eustachian tubes more often than anywhere else. The loss of tension or the relaxation of the membrana tympani being not so much a cause of deafness as is the fact that this condition indicates a wide open and usually infected eustachian tube with secondary atrophy, except in a few cases when it is due to autoinflation or repeated Politzerization.

The accompanying hearing test shows the result of a long continued toxic process acting in the same way as the systemic poisons upon the auditory labyrinths or auditory nerves. These cases are very common in which the hearing test is almost identical on both sides, the stapes movable, and in which a diagnosis of otitis catarrhalis adhesiva is usually made. The clinical history is one of frequent days marked by malaise, the hearing is worse with the exacerbations of the throat irritation or exhaustion, and the etiology dates back to a streptococcus infection following either gripe or the infectious diseases. The writer has seen many similar cases that were examined earlier, while the Rinné test was still positive, that seemed to point to some systemic poison and in which syphilis was considered as a probable cause. A careful history often revealed a very definite beginning of the deafness, with the exciting cause still active after a long number of years. In many cases the pharyngeal vault is free of lymphoid tissue and there is no history of head infections. The patient may even deny any tendency to sore throat, and yet the degenerate and infected tonsil in adults is usually the seat of the autointoxication and deafness. We may not be

able to make a diagnosis of a toxic focus, however, without noting the injection of the pillars of the palate, the perverted secretion of the pharynx, and the location of acute exacerbations, the macroscopic pathology of the gland itself not being sufficient ground upon which to base our conclusions. In association with these cases of lymphoid infection are many latent antra and apical abscesses of the teeth that may be overlooked more easily than pyogenic foci elsewhere, as, for instance, the ethmoid labyrinth. In chronic hyperplastic otitis media frequent attacks of rhinitis or recurring attacks of tubotympanic congestion are the rule, because the primary cause remains latent, and exhaustion is as productive of an acute exacerbation as is exposure. Whether the otoscopic examination of the tympanum indicates a previous chronic catarrh or is clear, depends upon whether the toxin was absorbed directly through the lymphatics or blood stream, or first caused a low grade process in the epipharynx, tube and tympanum. Both conditions may obtain in the same patient with the same etiology.

The following case is typical of a low grade infection existing for years, causing a chronic hypertrophic otitis media. The long continued toxemia has resulted in beginning auditory nerve degeneration, giving a typical hearing test:

March 18, 1918. Mrs. R., fifty-two years old; born, Massachusetts; married.

Past History.—Always well and not subject to acute infections. Commenced to grow deaf twenty years ago. There has been a gradual loss of hearing each year since. She has been under the constant care of a good aurist, whose treatment has been directed largely to the tubes.

Vertigo, no history of. Tinnitus, slight once for twenty-four to forty-eight hours. Headaches, history negative. Hearing not affected by climatic conditions. Scarlet fever at four years, diphtheria at fourteen years, measles at ten years. Throat trouble commenced as a child.

Examination: Ear—A. S., but little change in M. T. A. D., M. T., ground glass appearance. Manubrium not injected. Indrawn. L. R. gone. No areas of atrophy or thickening.

Nasopharynx, breathing free. Septum straight, no posterior

hypertrophies. Drainage good. No infection. Accessory sinuses negative. R. fossæ, free.

Pharynx—Low grade pharyngitis, especially marked on the sides. M. M. looks thickened and darkly congested.

Tonsils—Cryptic tonsillar disease. Both small and submerged. Patient now states that for years she has had an unusual amount of thick secretion in her throat, especially in the morning. That it is not unusual for her to get up nights to clear her throat and that the throat is always rough.

Teeth show no apical abscesses.

Hearing—

R.		L.	1024C ³ faint in A. D.
Shout	W. V.	Shout	2048C ⁴ not heard in A. D.
7"/15"	R512C ²	5"/15"	2048C ⁴ faint in A. S.
	Weber>+		No stapes fixation
	G.		(Gellé test negative)
256	L. L.	256	Air and bone conduction both lowered.

Diagnosis.—Both—Otitis, media secretory chronic with a low grade pharyngitis, the result of a chronic tonsillar infection. Beginning auditory nerve degeneration.

Treatment.—Tonsillar exenteration. Topical applications to pharynx.

It is well to emphasize in connection with this case the fact that it is not necessary to have a history of repeated attacks of tonsillitis, or to be able to demonstrate the presence of free pus in the degenerate type of tonsil so often found in patients between forty and sixty years of age. All cases that are causing toxemia do have, in the experience of the writer, an accompanying low grade pharyngitis with roughness and a tendency to clear the throat on rising, and perverted secretions. In this case the right ear shows the result of a chronic catarrh in the right tympanum. The left membrana tympani is clear, of pearly luster, and the light reflex is present, yet the hearing tests are practically the same.

To conclude, we find our etiology to consist in a chronic infection subject to acute exacerbations with varying degrees of virulency, constantly tending to invade contiguous as well as remote structures by continuity or through the lymphatics or blood stream. The tissue reactions in the tympanum, espe-

cially about the ossicular joints, seem to be the same as the reaction in other articulations to the irritation of a definite toxin. It is, therefore, obvious that treatment will be useless after secondary atrophy, arthritic changes in the ossicular articulations, or auditory nerve degeneration has taken place. The one serious problem is to establish immunity to a chronic infection. Drainage is essential, but there are secondary foci beyond our reach in many chronic cases. These cases must be treated on broad lines of corrected metabolism, hydrotherapy, out of door living, rest, etc., as well as locally, remembering that audition is only one function gone wrong in the symptom complex.

The improvement to be expected cannot be determined by the duration of the deafness or age of the patient, but by a careful examination. Very many cases can be helped, as shown by actual hearing tests. In others the process can be arrested. Many will have relapses on account of secondary foci and poor resistance. Others will show beginning auditory nerve degeneration, but, eliminating those cases that have passed beyond our aid, there are still a large number where we can expect good results that will be in proportion to our thoroughness and patience in searching out and draining chronic toxic foci and curing the attending infection. One point that should be emphasized is that very early in the hyperplastic catarrhs you may have beginning auditory nerve degeneration without marked lowering of the bone conduction, as well as changes in the tympanum.

Most of the cases here cited represent the terminal stage of a long continued hyperplastic process. At the beginning, one ear is more involved than its fellow, but with time the infection extends to the opposite side, until, in many cases, the hearing may be identical. If the advance has been by way of the eustachian tube and tympanum, the hearing for the two sides is more apt to vary than when the toxin acts directly by way of the lymphatics and blood stream. It is obvious that any improvement depends upon early removal of the cause and that any treatment by inflation or other means that does not take into consideration the existing infection is a loss of time and makes the patient ultimately worse, except an occasional use of such treatment in the hypertrophic stage.

LXVII.

ESOPHAGEAL OBSTRUCTION DUE TO ACCESSORY
THYROID.*

BY FREDERICK E. HOPKINS, M. D.,
SPRINGFIELD, MASS.

A case labeled unusual sometimes exposes the limited observation of the reporter—the unusual to him being no rarity to those whose experience in large clinics brings numbers of cases of almost every possible variety.

The case of esophageal obstruction presented herewith may have some interest, even if to most of you the possibility of its being due to hypertrophy of an accessory thyroid would seem more reasonable than it did to me.

Mrs. A., American, about forty years old, came to my service at the Springfield Hospital, November 16, 1917, complaining of inability to swallow solids. There was no enlargement of the thyroid or any symptom to direct attention to this gland. Her general health was good, save for such loss of weight and strength as followed the inability to take sufficient food.

The obstruction was so marked and its location so definite to the patient that she thought she must have "swallowed a bone." No foreign body was discovered by the esophagoscope, but about five inches below the level of the cricoid cartilage a soft, irregular, vascular growth projected into the lumen of the esophagus, from its posterior and left side.

A portion of this growth was removed and submitted to the hospital pathologist, Dr. Frederick D. Jones, for examination. When he reported this to be thyroid tissue, I was not a little surprised and more than a little skeptical as to the correctness of his diagnosis. However, Dr. Jones was positive as to the character of the tissue, and subsequent search of references to accessory thyroids made the diagnosis

*Read by title at the fortieth annual congress of the American Laryngological Association, held at Atlantic City, N. J., May 27th, 28th and 29th, 1918.

appear reasonable. A section is submitted for your examination. I will add that the vascularity of the growth was such that the removal of the specimen for examination was followed by sufficient contraction to permit of comfortable swallowing. The patient has recently reported herself so well that further treatment is declined for the present.

It is unnecessary to weary you with many references to the literature on accessory thyroids. The following are brief quotations from a physiologist, a surgical anatomist, a pathologist and two internists:

1. Howell: "Accessory thyroids varying in size and number may be found along the trachea as far down as the heart. They possess a vesicular structure, and no doubt have a similar function to that of the thyroid body."

2. Deaver: "Accessory thyroid glands occurring near the median line of the neck in the vicinity of the hyoid bone, and elsewhere in the neck, are regarded as being formed by division of the pyramidal process."

3. McCallum, speaking of the physiology of the thyroid, says: "Destruction of the thyroid gland in animals by operative extirpation is not easy, because there are practically always numerous minute nodules of the accessory thyroid tissue scattered in the neck, in the thymus, and inside the pericardium."

4. Wilhelm Falta, who quotes Maurer regarding the development of the thyroid: "The rudiments of the thyroid wander downward with the heart. Along the entire tract from the root of the tongue to the aorta may be found cut-off portions of thyroid glandular tissue, accessory thyroids, which may give occasion to the formation of abnormally situated goiters—tongue goiters, retrosternal goiters, etc."

5. Thompson: "Accessory thyroid glands have sometimes been found at the root of the tongue and in the pleura." Speaking of adenoma of the thyroid, he mentions "a rare malignant form as described by Hayward, with metastases of thyroid-like tissue in the lungs, bones and elsewhere."

Dr. Frederick D. Jones, a pathologist of this city, mentioned to me a like metastasis coming under his observation: "At the time of the removal of the growth—involving one of the lower ribs—the existence of the primary disease in the

thyroid was not suspected. Examination of this growth showed thyroid tissue."

6. Osler: "It may be mentioned that the aberrant, or accessory, thyroid gland may form large tumors in the mediastinum or in the pleura. I have reported two cases of this kind, and an instance is on record in which an enormous cystic accessory thyroid occupied the entire right pleura."

BIBLIOGRAPHY.

1. Howell: "Text Book of Physiology," 1914, p. 850.
2. Deaver: "Surgical Anatomy," p. 125.
3. McCallum: "A Text Book of Pathology," 1917, p. 807.
4. Wilhelm Faltz: "The Ductless Glandular Diseases," p. 53.
5. Thompson: "Practical Medicine," p. 537.
6. Osler: "Practice of Medicine," p. 751.

LXVIII.

LOCAL ANESTHESIA IN MASTOID OPERATIONS.

BY HENRY BOYLAN ORTON, M. D., CAPTAIN, M. C.

Nowadays in this great war, local and regional anesthesia have assumed a great importance in surgery, commensurately with the great evolution of local anesthesia, the procedure demands as much dexterity and experience as the operation itself. Local anesthesia has advanced fairly equally in all domains of surgery. We find it employed in ophthalmology, otology and laryngology to a great extent. It is my desire in this paper to speak of local anesthesia in otology and especially in regard to mastoids.

There is little need of going into the history of cocain and novocain. Everyone is familiar with it. Suffice it to say that it was only after cocain was used in ophthalmology by Koller in 1884 that local anesthesia was guided in a successful direction by the experiments of Corning in 1885, Roberts and Halstead of the same year, and then of Rectus and Schleich, Crile and others. Einhorn used novocain in 1905.

Contraindications.—Children and excitable and timid persons should not be anesthetized by this method, for the prolonged consequent nerve shock may lead to unpleasant complications, and interfere considerably with the operator. If the area of operation does not permit satisfactory local anesthesia, general narcosis should be preferred.

Preparation of the Patient for Local Anesthesia.—The terrors of the operating room and the bad impression which the patient receives from everything connected with an operation are removed, or at least considerably diminished, if a small dose of a mild narcotic be administered. Some claim that a soporific given the evening before is calming to the patient. We used small doses of morphin, grains one-sixth to one-fourth, one-half hour before the operation, and repeated at the time of the operation, but I am sure that there is advantage in using some soporific, especially in nervous women. Scopolamin has been advised by some, but the drug is not without

dangers and should not be used; I have seen some very bad results following its use. Novocain is less toxic, seven times less than cocain; it does not cause any damage to the tissues; it is soluble in water and easy to sterilize, and is capable of being combined with some adrenal preparation, which is very important. It is a white powder readily soluble in water and can be heated to 120° C. without any decomposition setting in. The dose may be large: as much as 90 grains have been administered without any unpleasant symptoms resulting. The untoward signs of toxicity are clonic tonic spasms and opisthotonus, restlessness and acceleration of respiration. Vomiting is not rare after administration by injection, but is quite far from significance. Braun and others have observed toxic symptoms as stated above in cases where 20 to 25 cc. of a 2 per cent solution. Fischer reports a case who became semicomatose after 3 cc. of a 2 per cent solution. Hysterical attacks have been observed after administration. Balza reports one fatal case after injection of 3 cc. of a 2 per cent solution for dental extraction.

The majority of the cases where untoward symptoms developed were those in which operations were around the mouth, and in this connection it must be remembered that adrenalin is not without danger; lymphatics are very free around the head and neck, and probably some of the untoward symptoms were from the adrenalin and not so much from the novocain.

Notwithstanding these isolated cases of untoward disturbances, we must regard the drug as an anesthetic that can be administered without risk to the patient, bearing in mind, however, the possibility of an idiosyncrasy. Solutions were used by us in the strength of from one-half to one per cent. In some of the cases a little adrenalin was so used, but I question if there was any decided advantage, as the field of operation was kept clean by the use of Allport's retractors.

The solution was boiled in a water bath before each operation. The instrumentarium consisted of a syringe of great durability, handiness and facility of sterilization and one that could easily be separated into its component parts. We used a Luer type of 10 cc. capacity, with straight needles. We employed a sterile table, upon which were placed all the ob-

jects required for the local anesthesia. The preparation of the patient for the operation consisted of having his hair entirely clipped and shaved, washed with green soap and water on the night before the operation. Attention was paid to the intestinal tract to see that it was empty, and no food was given on the morning of the operation. One-half hour before the time set for the operation $\frac{1}{4}$ grain of morphin and $\frac{1}{150}$ grain of atropin were given hypodermatically, and the $\frac{1}{4}$ grain of morphin repeated at the time of the anesthesia. Patient was placed on the operating table and the field of operation scrubbed with gasoline, alcohol and ether, and then the entire side of the head and neck was painted with 3 per cent solution of iodine, cleaning out the external auditory canal at the same time. Sterile towels were placed around the head, the field of operation only being exposed.

The fact that no assistant is necessary for the anesthetic is by no means to be underrated, but one should be seated in front of the patient with his hand on the patient's pulse so that he may give the operator at any time the volume and rate. Further, by talking to the patient the assistant will be able to keep his mind off of what is going on. Our procedure is as follows: The skin is anesthetized along the line of incision from above the auricle to one inch below the tip of the mastoid, at about which point a deep injection was made to block off the auricularis magnus nerve. Another nerve requiring blocking off is the occipitalis minor, which is about $1\frac{1}{2}$ inches posterior to the external canal and on a level with the floor of the canal. It can easily be detected through pressure before injection. Then the needle is pushed in deeply through muscle and under the periosteum, also along posterior wall of the canal, which is a very necessary part to anesthetize, for if complete anesthesia is not obtained at this point it will be very painful to strip the periosteum from the posterior wall of the canal in exposing the spine of Henle. After completely anesthetizing the area it is best to wait from five to ten minutes for the solution to take effect.

The mastoid gouges can be used on the cortex with absolutely no pain to the patient, and there will be no pain until the mastoid antrum is reached. When the antrum is once located, the cavity is filled with the solution, which is allowed

to remain while the operator works in the cells at the tip, and by the time these are cleaned out the antrum can be cleared out without any pain whatsoever. The operation is completed in the usual manner.

Case 1.—A nurse who had pneumonia and empyema, operated on for mastoid, under novocain.

Case 2.—Private D. P., 143d Inf. Modified radical mastoid, done under novocain.

Case 3.—Private W. S. B., 143d Inf. Mastoid following pneumonia, followed by a second mastoid on the opposite side, both mastoids being done under novocain.

Case 4.—Private E. C., 143d Inf. Mastoid, done under novocain, following brain abscess.

Case 5.—Private A. B. E., 111th Eng. Sequestrum of bone removed under novocain.

Case 6.—M. P. B., 143d Inf. Secondary mastoid under novocain, the first one being done under ether.

Case 7.—Private J. H. B., 142d Inf. Mastoid following pneumonia, done under novocain.

Case 8.—Private J. H. H., 141st Inf. Pneumonia followed by mastoid done under novocain.

Counting one double mastoid, there were in all nine mastoids done under novocain, and on the day I left the hospital they were doing another one under novocain.

Results showed:

1. Perfect anesthesia without prolongation of the operation.
2. Absence of danger to pneumonia from inhalation.
3. Convalescent period shorter.
4. Postoperative pain much lessened.
5. It is to be recommended in all cases following pneumonia and empyema where ether is contraindicated.

I wish to thank my assistants for their untiring aid, for without whose help we would not attained the marked success we did: namely, Captains C. P. Schenck, W. Lebkicher, W. W. Boyne and J. Boone.

LXIX.

DISEASED FAUCIAL TONSILS: THEIR TOXIC,
INFECTIOUS AND REFLEX EFFECTS.

BY J. LESLIE DAVIS, M. D.,

PHILADELPHIA.

Faucial tonsils, always conspicuous in medical theories and practice, in a measure mysterious, inciting suspicion and inviting investigation, have recently figured in higher favor than ever before through the stimulus which the last few years have given to the study of focal infections; and while the abundant evidence of widespread interest must be counted a favorable factor for progress, I must confess that I also find its influence not without a degree of dissuasive effect on one who would attempt to add a thought worthy the attention that the occasion invites.

My hope in outlining the topic of my task was as follows:

1. To add my bit toward the further recognition of the epoch making advances in recent years in the field of focal infections, and the relative importance of the tonsils as the chief factor.
2. To present some interesting clinical phenomena associated particularly with the toxic properties of tonsils which, in my opinion, have not been given sufficient consideration.
3. To endeavor to form a clearer conception of what really may be termed reflex phenomena, direct and indirect.
4. To summarize the evidence, which today is sufficiently conclusive to insure a true bill of indictment against the tonsils as the one greatest potential menace to health that is harbored within the human body.

With a fuller appreciation, however, on further investigation of the thoroughness with which nearly every phase of the subject has been handled, I feel that should I succeed in simply emphasizing the responsibility which our modern opportunities impose, my temerity in the scope of my undertaking may be forgiven.

Medical science is replete with instances where long observed clinical phenomena remained vague in their meaning till explained by laboratory research, among which the effects of diseased faucial tonsils have become one of the most notable examples. By the term diseased tonsils it is not my intention to include tonsils involved in acute infections nor those affected by neoplastic changes, but only that type in which is recognized the almost constant pathologic changes common to all ages, though usually more active in childhood and adolescence, which harbors within its crypts recurrently or continuously various and manifold pathogenic organisms, the most constant as well as most virulent of which are the streptococci, with their variable cultural characteristics. While the conditions which are responsible for the development of such foci of infection are interesting phases of the subject, they are beyond the scope of this paper, though it may not be without relative importance in this connection to recall that, according to Barnes,¹ "degeneration of the cryptic epithelium usually begins after the sixth month of infancy and is well advanced by the end of the first year." From this early opportunity for the establishment of infected foci to old age, no period of life is immune, though the years of childhood and adolescence are generally recognized as the most constant. These harbors of infection, with or without local manifestations, with or without local subjective symptoms, affected or infected adjacent or distant organs, membranes and tissues, were long ago suspected and recorded by various clinicians, but the principles involved and the intricacies of transmission remained to be explained in our present day by the combined studies of skilled bacteriologists and clinicians. Among those to whom great credit is due for their brilliant accomplishments toward the establishment of definite data along this line no reference to the subject should omit the names of Beck, Billings, Barnes, Cecil, Crowe, D. J. Davis, Loeb, Rosenow, Sluder, Shambaugh, Wood and Wright; while for a comprehensive and lucid presentation of the work which has been done along the line of obtaining conclusive evidence against the guilty tonsil I commend the recently published articles of Albert Barnes, J. M. Brown and Daniel W. Layman. All observations in my own experience regarding

the tonsils and the focal infecting source of numerous diseases are but corroborative of these authors, who I believe have as thoroughly as they have conclusively established the certainty of their declarations. To say that today we know that rheumatism, arthritis, pericarditis, endocarditis, nephritis, neuritis, appendicitis, cholecystitis, adenitis, iritis, and even cases of headaches, various forms of neuralgias, gastric and intestinal indigestion and intestinal autointoxication may be purely secondary to a focus or to foci of infection located elsewhere in the body, of which the faucial tonsils are the most frequent location, is to make a statement which can be demonstrated clinically and substantiated bacteriologically.

One line of investigation of diseased tonsils, which I am convinced, however, will yield more interesting results than have yet been revealed, is that of toxic absorption and transmission, a field in which the chemist's aid must also be summoned. From clinical observations for some years I make this statement with the expectation of more conclusive evidence in the near future, namely, that the poison of putrefaction in diseased tonsils exerts its most potent and far-reaching influence through its effect upon the liver or its biliary secretions. Whether it acts upon the liver in a way that inhibits the secretion of bile or whether it acts upon the bile itself as a neutralizing or transforming agent I am not prepared to say, but the ultimate effect is to produce intestinal autointoxication and hence indirectly to produce both the local and systemic symptoms of toxemia. Through this indirect process I believe the tonsils to be the most frequent and common cause of colds in the head, so-called bilious headaches, intestinal indigestion, and even appendicitis, by weakening resistance to infection rather than by direct or indirect transmission of the tonsillar infection itself. I further believe that many cases of cardiac arrhythmia are results of the same toxic influence and offer as a typical example the case of my own personal experience.

History.—In childhood I was subject to frequent sore throats, tonsillitis and colds; during adolescence the throat affections became less frequent, and I was considered in good health, though poorly nourished and not physically strong; the same physical conditions continued into early adult years,

though with each passing year the susceptibility to colds and throat infections continued to decrease, with the exception of two or three years following an attack of measles at the age of twenty, when the earlier susceptibility to colds recurred; between the ages of twenty-one and twenty-five three severe attacks of appendicitis were experienced, though successfully treated without operation, and they have never recurred since; I have never suffered any other severe illness, and though six feet two inches in height, my weight ranged between 130 and 135 for a period of twenty years, from the age of twenty to forty; at about thirty-five years of age I began to have occasional "sick headaches," and about five years later developed an irregular heart which at first would last only a few days or less and then probably seem normal for intervals of a week or two, or even longer; these intervals between attacks, however, grew shorter during the next two years, while the headaches occurred oftener and more severe. Examinations by three competent physicians gave assurance of no organic lesion, which had a most beneficent effect upon my mental attitude, since the arrhythmia was becoming so marked when lying in any position other than upon the right side that a comfortable night's sleep was rarely obtained, though the usual routine of each day's work was performed. Then the following associated phenomena were observed: namely, that the headaches were always preceded and accompanied by a bad taste in my mouth and an aromatic or acetone odor to the breath; that with the development of these symptoms the feces became clay colored, which a combination of calomel, blue mass and compound extract of colocynth would not only relieve, but when taken in time (as suggested by the peculiar taste as of tonsillar exudate) would in a large measure obviate both the headache and the heart irregularity. While this was a great improvement in both physical and mental comfort over the previous two years, it could not be called satisfying, and in August, 1916, under general anesthesia, my tonsils were enucleated. The first thing thought of on recovering consciousness was to turn on my left side and see if the heart would "behave." It did, and is now, nearly two years later, still regular. The characteristic premonitory taste has never returned at all, the headache has

not recurred more than two or three times, and then in a mild form, while the liver has functionated normally ever since, and my unvarying weight for the past year has been 168 pounds. I have many cases on record in respects similar to the above, though not all with the heart symptoms, whose results from operation were as encouraging as they were convincing.

It is surely evident that the toxic products of tonsils play a far more frequent and important part as etiologic and aggravating factors in both gastric and intestinal indigestion than has yet been fully appreciated, and when the chemistry and the toxic properties of the cryptic, or rather the entire intracapsular contents of caseous tonsils, shall have been as thoroughly worked out as the bacteriologic composition and the pathologic changes, I doubt not that we shall have added to both our diagnostic and treatment equipment a valuable aid in many so-called constitutional diseases.

An interesting phenomena observed in the occurrence of headaches or neuralgias associated with acute hepatic inaction or biliary inhibition is their frequency with approaching atmospheric storms. In fact, so closely are the two conditions associated, that by the functional disturbances of one so predisposed, the weather change can usually be prognosticated with remarkable accuracy. In other words, the physiologicofunctional storm is concomitant with the fall in barometric pressure that immediately precedes an atmospheric storm—the toxic symptoms subsiding with the falling rain or snow.

I have never seen these manifestations in anyone who did not have diseased tonsils, nor, on the other hand, anyone subject to such experiences who did not notice marked relief after the tonsils had been removed. Local disturbances, either subjective or objective, however, are very seldom observed during such occurrences—surely nothing that could be commonly associated.

The absence of local symptoms in the great majority of diseased tonsils has been and still is one of the chief retarding factors in the awakening of both the physician and the patient to the realization of the danger that lurks within the crypts of a tonsil that to all appearances is quiescent.

We hail with rejoicing every new evidence that we are

awakening to the seriousness of tuberculosis, of syphilis, of infantile paralysis and many other of the less tragic infections; the public is taught that the germs are lurking everywhere outside the body, and so effective have been the propaganda against them that every external hygienic measure for the prevention of their spread is almost universally recognized; and yet, to use a metaphor, in the vernacular of the hour, a mighty host of the most virulent germ enemies are already mobilized within one of the most advantageous positions within the human body, from which intrenched position every avenue is open by way of the respiratory, alimentary, circulatory and lymphatic systems for their advance toward undermining and destroying the resistance of every tissue to any and every germ with which chance might bring us in contact. The time is propitious when the public must realize, as they are already being taught to realize through the timely wisdom of a few municipal boards of health, that diseased tonsils are doubtless the most constant menace to the health of everyone, child or adult, and that the only cure or effective relief is their complete enucleation.

I frankly state that I believe the majority of tonsils are diseased tonsils, and that everyone whose tonsils are in any measure diseased would be healthier, stronger and happier without them—but I do not by any means advocate that all should be removed, regardless of other conditions. Every case is a law unto itself and must be studied carefully from every standpoint, that no existing contraindications may be overlooked. A point which I wish particularly to emphasize is that almost without exception critics of tonsil removal have been compelled to form their opinions from one of two things or both, namely, errors in diagnosis or imperfect surgery, and principally the latter.

This statement of criticism is made with the most charitable intention, not with the idea of discouraging anyone who would aspire to tonsillar surgery, but to encourage and insist that it must be undertaken with the fullest realization that it is an operation which demands the most thorough knowledge of general and localized principles of surgery and the careful acquisition of mechanical skill and precision. There are far too few surgeons who have mastered the art of tonsillar enu-

cleation, from whom the rest should take counsel and instruction, as there are far too many whose temerity in the undertaking is born of rashness rather than courage.

I have never seen a single patient whose tonsils had been completely and skillfully removed under the influence of a properly administered anesthetic, whether local or general, who was not the better as regards physical comfort and safety from the various systemic infections and toxemias.

Finally, I am prepared to affirm and to defend the following conclusions:

1. That while tonsils were most assuredly "created for some definite purpose," it is evident that in the present stage or age of human physical development (or degeneration) that their function is either nonessential or else there exists some vicarious functionary support, complete in its efficiency.

2. That a large percentage of tonsils are so diseased that their intended function is either suspended or destroyed.

3. That the greatest harm to the individual from diseased tonsils is from transmitted infections to other organs or structures or else, through toxic absorption, the weakening of normal resistance to those infections.

4. That the most harmful influence of the toxic element is exerted through its effect upon the liver and kidneys, especially the liver.

5. That the thorough and skillful enucleation of diseased tonsils, against which no physical contraindications exist, is today the most effective measure within our knowledge for the relief of existing secondary systemic diseases or the prevention of their future development.

LXX.

CONTRIBUTION TO THE STUDY OF
RHINOPLASTY.*

By PROFESSOR E. J. MOURE,
BORDEAUX.

It seems that after the publication of the important work of Messrs. Nelaton and Ombredanne the question of rhinoplasty has been so completely studied and adjusted to the requirements that there is nothing further to be added to that interesting treatise. The various procedures for restoring a loss of the nasal appendage as a whole or any of its parts have really been set forth and discussed in a masterly manner in the work to which I have just made allusion. Furthermore, in setting forth the criticism of each method the authors have added their own personal note, following what they have called preferable procedures which they recommend using in certain cases determined beforehand.

But the present war has resulted in much more extensive destruction than that due to syphilis or surgical operations to which the nose has been subjected. Many wounds indeed exceed all anticipations and evade the most minute descriptions. Besides this, operations performed in consequence of war-wounds deal with cases where the soft parts and the framework of the nose are destroyed and also with those in which there are thick cicatricial keloid tissues difficult to remove and also to unite, and with the tendency to become infected and to suppurate, thereby rendering external restorations of the organ of smell very complicated and very hazardous.

Wounds from bullets are usually simple enough, causing little shattering especially when they make a single perforation which, if it does not involve the opening of the nostril, will cause slight disfigurement in consequence.

On the other hand shell and grenade fragments often cause extensive destruction of a part or even the whole of the nose (soft parts and framework) involving the neighboring parts, eyelids, cheeks, superior maxillaries, accessory cavities, etc.

*Translation made in the office of the Surgeon-General of the Army from the original which was published in *La Restauration Maxillo-faciale*.



Figure 1. Condition of wound on admission.

What characterizes such wounds is that generally healing occurs with the formation of scar or new formed tissue, thick and adherent, which is consequently difficult to use for plastic work, to such an extent, that it is very often preferable to remove it and to replace it with other more pliant and easily



Figure 2. Tracing of first operation. The nose has been resected and the cicatrized tissues removed. handled and more healthy issue, borrowed from the adjacent parts.

The skin of the forehead under the circumstances has very often been used by us when that region had been spared by the projectile.

In war rhinoplasty intended to supply loss of important substance, especially when there has been an anfractuosity, we must expect to make not one but several operations to

obtain the best esthetic results, which is the ideal sought. To close the orifices of communication with the outside and to restore the soft parts constitute usually the first part of the reconstruction treatment; to restore or to create some portion of the bony bridge of the nose will almost always be the indispensable accompaniment of the earlier operations. In order to render the subsequent operations easier and more effective, specialists, surgeons or physicians, whose duty it is to give the first treatment to those who have nasal wounds,



Figure 3. The same as figure 3, after suture.

should exercise the greatest care to preserve the natural passages, that is, the nasal cavities and especially the orifices of the nostrils. Indeed we have very often had occasion to see wounded men whose restoration externally was entirely satisfactory, but in whom the nasal passages were filled with fibrous cicatricial tissue, making nasal respiration impossible or in whom the natural orifices were subjected to atresia or closed by vicious cicatricial growths.

Therefore to retain the respiratory function, where there has been a wound of the nose or the face, it should be the first duty of the surgeon to insert a gauze tent into the nasal

orifices and later a rubber drain. The esthetic treatment will come last and will be almost secondary.

This part of endonasal therapeutics was not subject to study by Nelaton and Ombredanne, who had no special reason to devote their attention to it as they were concerned especially with external imperfections in the form of the organ of smell, imperfections caused by diseases or operations which, in the main, would not interfere with the respiratory function of this advance sentinel of the organs of respiration.



Figure 4. View after permanent cicatrization.

Serious or even slight wounds in the face and nose injuring both the outside and inside of this organ require in consequence a treatment which takes care at the same time of the functions which it is intended to conserve: respiration and the sense of smell as well as its external form.

The case, with illustrations here reported, was particularly interesting from these different points of view. It is chosen from among many because of the extent of the lesions and the perfect result obtained from the functional and esthetic points of view.

Open wound in the nose and face (left side) caused by a grenade fragment. Nasal plastic, including the bony bridge (crest of the tibia). Service of Prof. Moure.

Sergeant V.—Thirty-four years old, Fifteenth Infantry. Wounded in face Feb. 1, 1915, by a fragment from a grenade. Considerable loss of the nasal substance extending from the middle of the nose to 1 cm. from the intersuperciliary line and extending externally and downward towards the left ala. This opening was at least 1 cm. wide and 4 cm. long and the soft parts were divided as in paralateronasal rhinoplasty. The



Figure 5. Second operation. Removal of keloidal tissues; frontal flap with adipose tissue.

bones of the nose proper on the left side and the floor of the nose were broken away and even destroyed. Through the opening the septum was observed forcibly turned to the right side and with two apertures cut as if with a punch, parallel and extending to the bony bridge of the nose. There was edema of left lower eyelid but no trace of facial paralysis.

The left maxillary sinus, which was opened and which was infected and suppurating, was at that time (March 20, 1915, when the patient arrived in the hospital), in good condition, and there was no nasal secretion.

After having reestablished the caliber of the nasal chambers, obstructed by the cicatricial tissue, by removing all of the cicatricial tissue which blocked up the nasal chamber and formed synechiae between the inferior and middle turbinates particularly on the left side, we proceeded on June 21, 1915, to the formation of the nose, freshening up the edges and removing the cicatricial tissue and replacing the nose in position.

In spite of this operation, it was unsuccessful; the original opening did not close up, for the reason that at the newly



Figure 6. Suture of wound.

formed cicatricial tissue a misshapen opening still remained.

On Nov. 9, 1915, a new operation was undertaken. All of the cicatricial tissue which formed an imperfect restoration was removed (Fig. 4). These keloid cicatrices were replaced by a frontal strip cut as shown in the fig. 5, so as to provide healthy, pliable tissue. The patient was then dismissed for a month of convalescence. On his return, Dec. 1, 1915, he was massaged under warm air which gave good results by making the tissues of the nose pliable.

The outside opening was thus completely closed; the patient was breathing satisfactorily through his two nares; the nasal cavities were not entirely free because of the deflection

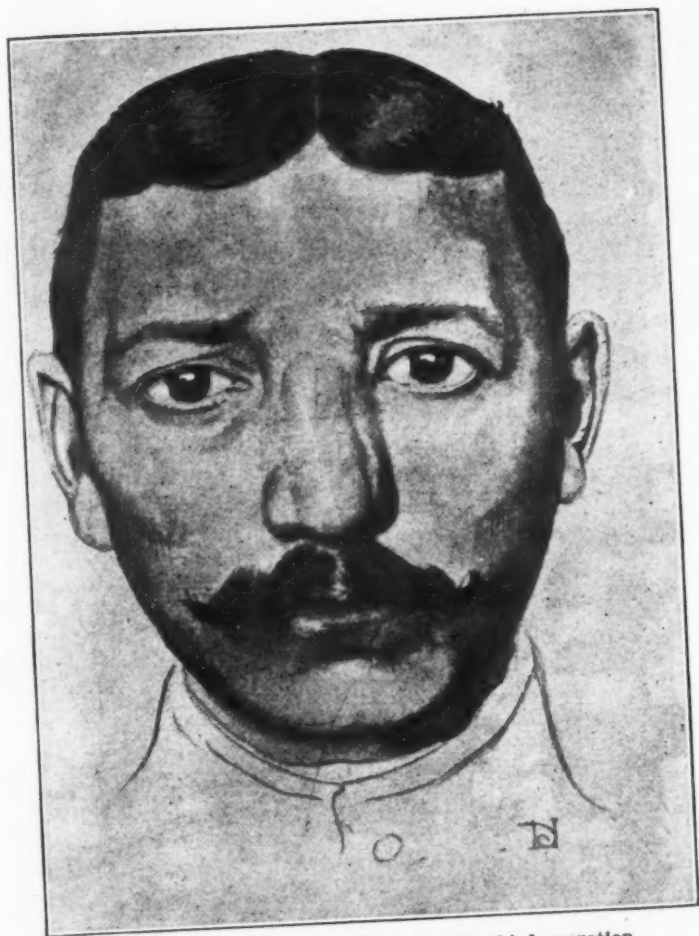


Figure 7. Full view of the face after the third operation.



Figure 8. Profile view after permanent cure.

of the septum and a few fibrous synechiæ; the bony bridge of the nose was absent and there was quite a deep saddle-shaped hollow present. April 17, 1916, nasal osteoplasty was performed. A triangular strip of bone from the crest of the left tibia about 4 cm. was inserted, after it had been trimmed above and below, into an incision made in the upper part of the root of the nose, so as to make a new bridge for the nose. When the strip had been introduced the nose was raised up from the root to its lower extremity. Then the wound was sutured.

The patient did not spit up any blood or blow any out through the nose which showed that the mucous membrane was not injured.

June 14, 1916. As the right nasal chamber was still obstructed by the dislocated septum the air did not pass through this opening. The left nasal chamber, on the other hand, was larger in spite of the presence of a little synechia from the turbinate to the septum (middle portion). Further, a small perforation was visible through the left nasal chamber. The cartilage of the dislocated septum was resected with a knife in the right nasal fossa. In this way, the perforation was enlarged. The end of the corresponding turbinate was resected with forceps and finally the operator destroyed the fibrous bridge in the opposite nostril.

August 24, 1916, the patient was transferred to the ophthalmologic section. He has been accepted as fit for service.

Comment.—The figures accompanying this observation show much better than a close description could by what series of operations the result sought was secured.

Facts of this kind are evidently numerous but nevertheless they deserve to have themselves added to those already known and often described in the work to which reference was made at the beginning of this article. They well prove that individual initiative ought still at the present time to add to the classical descriptions, for a projectile or at least certain projectiles may make mutilations which could not have been anticipated in advance; it is therefore impossible to establish a fixed rule which must be followed and a chosen method which is best to apply as each case will have its own general as well as special indications.

WOUNDS OF THE FACE AND MAXILLARY BONES.*

BY PROF. E. J. MOURE,

BORDEAUX.

During this terrible war through which we are passing the face has been injured by all kinds of projectiles, which have penetrated or mutilated it in all its constituent parts. Warfare of trenches and field fortifications has especially favored the wounds of this region. We have seen wounds of the upper or lower jaw which have been perforated in one direction or another, without leaving any great disfigurement. On the other hand the wounds of the face due to shell fragments or explosive balls have generally resulted in much greater mutilations.

Thus in some the upper or lower jaw has been injured; in others both at the same time have been more or less abraded, fractured or carried away. The most horrible wounds have been observed, especially when they involve the lower part of the neck, the esophagus and the pharynx; sometimes with fatal results; but more frequently it should be said, the wounded have resisted these injuries and it was possible to transport them to the rear where they came under our care.

We pass over the small perforating wounds, or the slight injuries of the face, and report here simply two cases of extensive loss of substance, compelling us to perform more or less complicated and delicate plastic operations.

In these cases of mutilating wounds of the face as in extensive wounds of the limbs or any part of the body the important question to decide is whether to undertake immediate closure or to perform a secondary flap operation at a later period. It is quite certain that very vascular tissues of the face show considerable vitality and are therefore well nour-

*Translation made in the office of the Surgeon-General of the Army from the original which was published in *La Restauration Maxillo-faciale*.



Figure 1. Condition of the wounded at the time he was injured by the projectile (explosive ball, he says). The tissues of the left cheek are horribly torn and carried away. The two maxillaries have been broken up and partly destroyed, several teeth broken out and carried away.

ished. An attempt may be made in many cases, after thorough cleaning, to bring together the parts separated by the projectile, or at least to approximate them to a certain extent, in order to obtain a partial restoration and ultimately to favor a definite plastic operation.

In principle we should be careful to conserve apparently mangled or badly detached pieces of tissue for such a strip, useless at first sight, may, when cicatrization is complete, serve to restore a portion of the face. It is only when the tissues are mashed, abraded and mangled by the projectile and therefore liable to necrose that we are justified in cutting out portions or entirely removing them in order to bring the bony framework or more often the soft parts together.

Unfortunately these immediate reparative methods are not always done with an esthetic taste. Thus I have seen eyelids sutured vertically, torn lips placed far from their normal position, when it seemed a simple matter either to leave them in their place or at least to bring them as near as possible to their usual situation. In most cases, the surgeons content themselves, as soon as the initial hemorrhage is stopped and the wound cleaned, with sending the patient to an evacuation hospital, where they almost always try a secondary repair operation, which fortunately in a good number of cases is possible.

In the beginning of the war we saw a considerable number of cases of this type which could be operated upon with success at home. For many months past, we have seen only men with mutilated faces who have passed through several hospitals and who were finally sent to us that we might make them a more or less esthetic face.

In such cases we must, as Morestin said in a recent communication to the Academy of Medicine, arm ourselves with much patience and not be afraid to make, at considerable intervals, a series of plastics on the same patient which will gradually enable the mutilated face to take on an appearance which approaches the normal as much as possible.

Operative procedures.—The operative methods are as varied as the wounds and mutilations and it is therefore impossible to describe them. The circumstances and the special features of the cases oppose any definite rules.

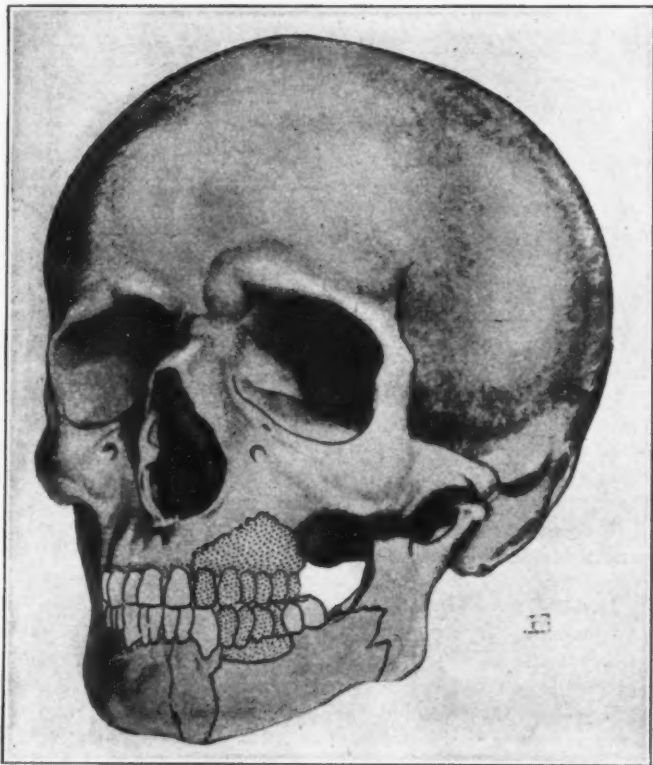


Figure 2. This figure shows the bony portions of the inferior maxillary destroyed by the projectile. They are indicated by a dotted area. This reproduction of an X-ray picture shows the lines of vertical fracture which occurred on the horizontal ramus of the lower jaw, one at the junction with the ascending ramus and the other a little external to the symphysis menti.

Indeed, it is, as Morestin said, a true game of patience (*jeu de patience*) to bring together parts which have been separated and which are often incomplete in order to succeed in reconstructing a face with a human semblance and to prevent the unfortunate from becoming an object of horror to his fellowmen.

Most frequently it is not sufficient to repair the facial covering. We must also realign or replace the bone which has been destroyed by use of a more or less ingenious prosthetic apparatus. Sometimes it is a lower jaw whose fragments must be kept in place in order to permit the fractured fragments to consolidate or the bone to regenerate so that a pseudoarthrosis, always harassing to the patient, is avoided.

In this case, the intimate collaboration of the surgeon who performs the plastic operation on the face and of the prosthetic stomatologist must completely harmonize if we wish to obtain the maximum results.

We report here the cases of two patients, one wounded on the cheek in whom the lower jaw was fractured while at the same time the upper jaw was partly destroyed at the level of the alveolar border. Figures 1 and 2 show the condition of the wounded man at the time he was injured.

In the first figure we see the wound still gaping, extremely mangled, contused and horribly mutilated. The gaps in the bony framework are shown as a dotted area on the lower jaw and on the alveolar border at the level of the left molar.

An attempt to bring the lacerated parts together was made at the front. This was not without value, for later when the fractured jaw had consolidated, it made it possible to make sufficient repairs so that the patient was able to leave the hospital with a mere streak of cicatricial tissue indicating the borders of the cheek. A prosthetic apparatus replaces the defective portions of the hard palate and maxilla.

The history of this patient is as follows:

Case 1.—Cesar M., soldier, thirty-five years old, of the Nineteenth Infantry.

Wounded Nov. 6, 1914, at Dixmude by an explosive ball; extensive gap on the left side destroying the cheek, the labial region and the left half of the tongue. He was brought to the Otorhinolaryngologic hospital of the eighteenth region

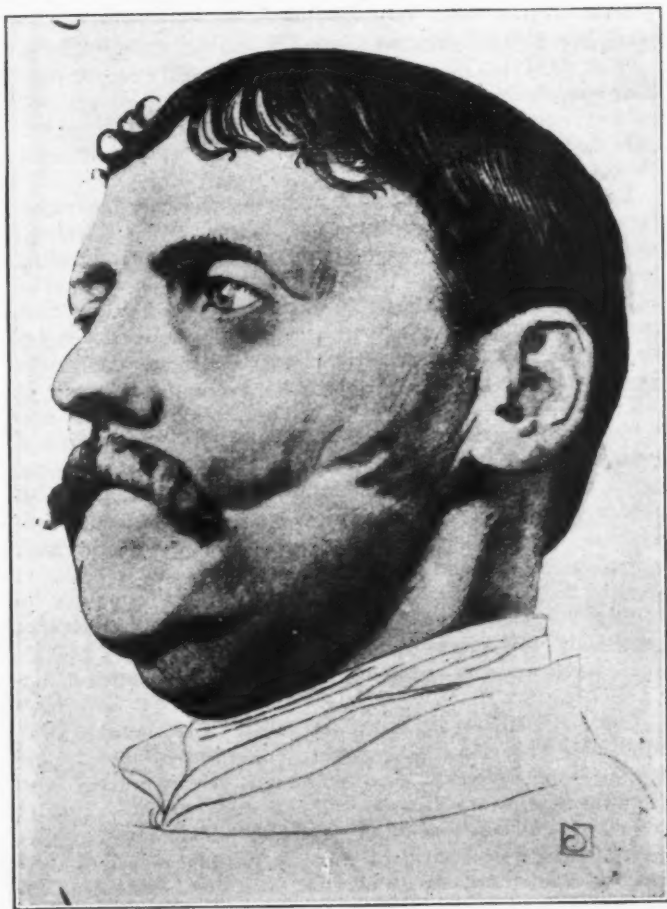


Figure 3. Shows the same patient at the time he left the hospital. Not only are the gaps in the soft parts filled out, but the patient, provided with a prosthetic apparatus for replacing the teeth carried away by the projectile, can easily open his mouth and masticate.

(Subsidiary Hospital No. 25), Nov. 13, 1914, coming from the Marine Hospital at Brest. Compound fracture of both maxillary bones badly infected.

Nov. 25, 1914. Plastic operation, first stage (Prof. Moure). Removal of free bone splinters. Disinfection of mouth. Reconstruction of cheek and labial region.

Dec. 16. Second stage. Completing the reconstruction of cheek.

Jan. 4, 1915. The gap is closed, the mouth reconstructed, the plastic and functional aim accomplished. The lower jaw whose arch has been scrupulously preserved, alone remains to be treated.

Feb. 13. The patient shows slight facial paralysis. There is a small fistulous tract in the malar region, in the middle portion of the cheek as well as in the region of the chin (right side).

Feb. 23. Curettage of both tracts. In the lower some bone splinters are found; cleansing with zinc chlorid and bandage. In the upper tract there were no bone splinters, but some pus below the eye; zinc chlorid.

March 15. Incision on the left side from the labial commissure into the old cicatrix. Upper gum as well as labial commissure repaired.

April 25. Suture of lip gives way.

May 3. Plastic repair of the upper left gingivolabial groove and left buccal commissure. (Prof. Moure.)

May 18. Sent to a convalescent hospital. Returned June 25.

July 1. Plastic repair of the left labial commissure. (Prof. Moure.) The mouth is enlarged, a portion of the alveolar border is repaired and cicatricial bands which prevent complete opening are cut.

Aug. 5. Plastic operation repairing left gingival margin. (Prof. Moure.) A strip of gauze is introduced between the gingival border and the cheek from the lateral incisors to the extremity of upper maxillary border. The gingival flap is turned back on itself and retained by U-shaped sutures.

Aug. 11. It is found that the sutures have given way.

Sept. 9. Gingivoplasty. (Prof. Moure.) Incision of the cicatricial tissue on the left alveolar border, the cheek is sep-

arated from the bony wall and the cavity filled with iodoform gauze.

Oct. 22. Patient is transferred to the division of stomatology. A prosthetic apparatus is applied.

He opens the mouth well, having only one cicatricial band at the lower vestibule (gingivolabial furrow) which had to be cut in order to apply the dental apparatus.

Case II.—The other patient whose case we report here was much more seriously wounded.

He entered our hospital a very few days after he was wounded, in such a condition that we had first to remove the free splinters and disinfect the wound cavity. As can be seen in the accompanying figure the whole anterior portion of the upper jaw, the hard palate and the dental arch had been torn away by the projectile. The mouth, horribly mutilated, formed merely a large crater communicating with the nasal fossæ. The orbital cavity was not completely emptied but the eyeball was severely injured and formed a rather shapeless stump without value for vision. The lower eyelid was badly mutilated.

After having employed a few days in disinfecting the wound and obtaining cicatrization of the margins of the wound cavity, I performed the first operation, in which I confined myself to closing the cheek opening by freshening up the margins of the wound without concerning myself with the esthetic aspect of the face.

At a second operation I tried to reconstruct the lip and to put the mouth in its place. The eyelid was repaired and the mouth was somewhat shaped at a third operation.

My colleague Lagrange, to whom I afterwards sent this patient, performed enucleation of the left eye and replaced it by a glass eye.

The patient, Corporal T., twenty-seven years old, was wounded Oct. 31, 1914, at Ypres by a shell fragment striking the left side of his face. The patient was brought to the otorhinolaryngologic service of the eighteenth region, Jan. 10, 1915, coming from the Marine Hospital at Cherbourg.

Examination: The patient was hit by a shell fragment in the region of the left canine fossa. There was a wide opening from the orbital margin to the superior dental arch, including



Figure 4. Severe mutilation of the face by a shell fragment. The left superior maxilla has to a great extent been destroyed by the projectile, which also carried away a large portion of the hard palate, opened the nasal fossae, fractured the lower jaw, injured the orbit and partly emptied the eyeball by carrying away the lower lid.

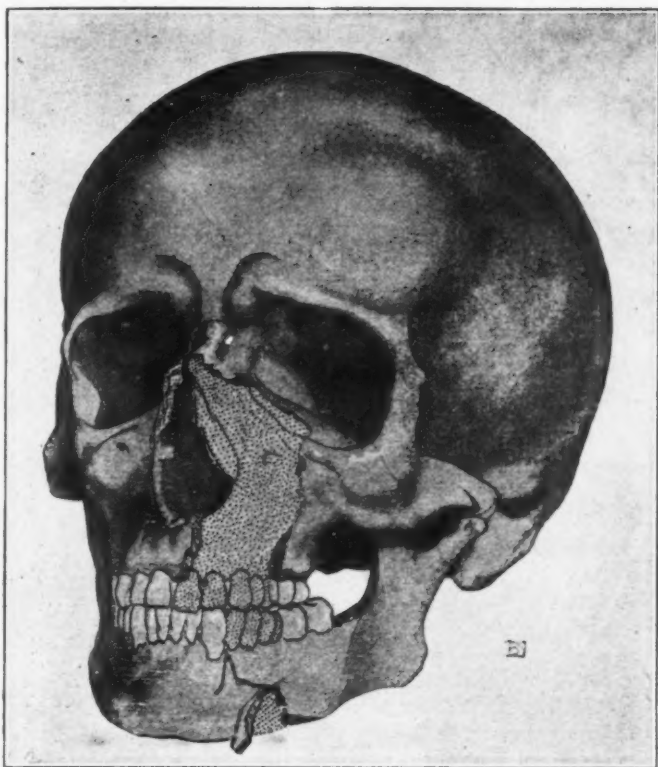


Figure 5. Shows the bone defect and the line of fracture on the horizontal ramus of the lower jaw. This figure, made from an X-ray picture by Prof. Bergonié, indicates the importance of the skeletal lesions clearly. There is almost complete destruction of the bone mass of the upper jaw, indicated on the figure by the dotted area; the nasal bones proper have also been broken and carried away.

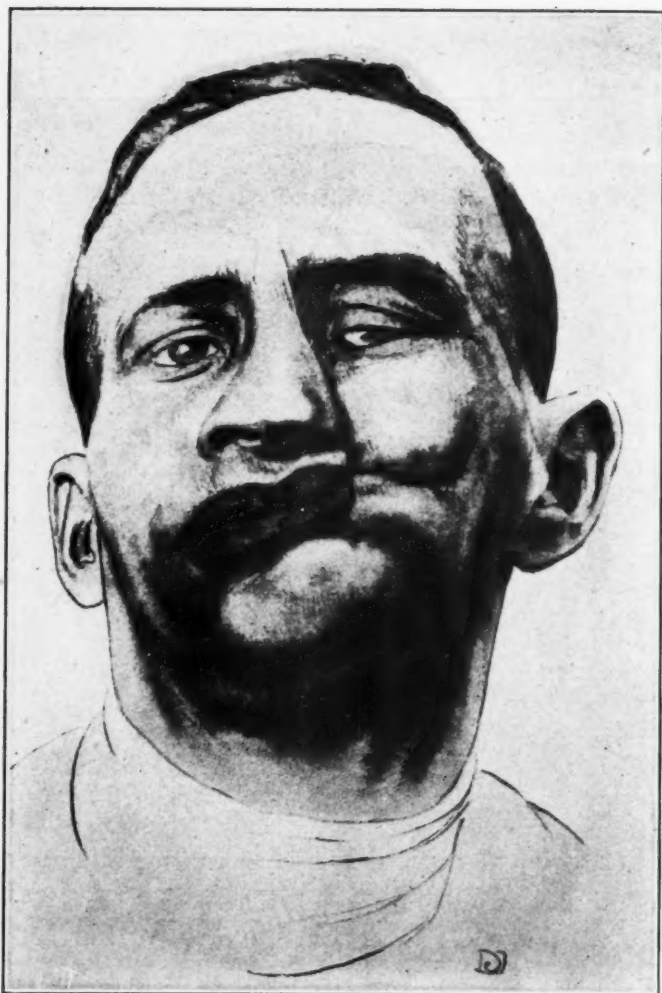


Figure 6. After closure of the bone gap by bringing the soft parts together. The upper lip still deviates very much, and the mouth is therefore markedly drawn upward on the left side. The object of this operation was only to close the wide hole which gave this unfortunate man a horrible appearance.



Figure 7. A few months later. The mouth has been reconstructed by means of a triangular flap, raised from below in order to reconstruct the upper lip. In a series of intermediary operations the buccal cavity was restored, the gap in the hard palate was filled with fibrous tissue in such manner that separation of the mouth from the nasal fossae was brought about. The labial commissure was restored and the tongue separated from the floor of the mouth.

the corresponding portion of the hard palate. Thus there was an extensive quadrilateral opening its inner border following vertically the nasofacial groove from the orbital border downward and passing to the inner side of the malar bone and reaching the first upper molar. The alveolar process could be seen projected to the floor of the cavity, the molars remaining attached but turned around so that their posterior surface looked forward. The hard palate was torn away to the border of the soft palate which was preserved.

The cartilaginous and osseous nasal septum had been carried away as well as the anterior two-thirds of the right lower turbinate. There was even a communication between the lower meatus and the right maxillary sinus. The right lower eyelid had been partly destroyed and the conjunctiva formed an ectropion triangular in shape. Externally the patient presented a large cicatrix starting from the left labial commissure and passing to the level of the hyoid bone where there were fistulous tracts with raised orificial margins. The upper lip, being cut, has partly grown to the wall of the canine opening, the remainder being very much swollen and forming a large bulging above the lower lip. Left eye was gone.

Jan. 11. X-ray picture shows fracture of the upper jaw, fracture of hard palate, penetration of a tooth into the maxillary sinus, fracture of lower jaw.

Jan. 16. Removal of small bone splinters.

Jan. 18. Incision under chloroform at the pomum adami. Several bone splinters are removed. Iodoform gauze; suture. Two teeth which have been forced with the left superior maxilla into the posterior portion were removed. The upper jaw cannot be brought forward. (Prof. Moure.)

Jan. 22. The wound is doing well and suppurates but little.

Feb. 22. Plastic operation of the face. (Prof. Moure.) The cheek is freed and the loss of substance overcome by suturing it to the nose. The left nasal orifice and the buccal commissure are reconstructed.

March 17. Patient is sent to a convalescent hospital. Returned April 20.

April 26. Redness of the swelling in left suborbital region. Ichthyol ointment.

May 6. Another operation. (Prof. Moure.) Half of



Figure 8. This figure shows the man at the time he was transferred from my service to that of Dr. Lagrange (ophthalmology) for the enucleation of the left eyeball, partly emptied by the projectile, and for an ocular prosthesis. The stomatologic service also made a prosthetic apparatus for him to replace the teeth which were wanting. Dilating exercises succeeded in producing a buccal opening sufficient to enable him to easily feed himself.

the upper lip is reconstructed by means of a flap taken from the scar of the lower lip.

May 26. Separating of the jaws is begun.

Oct. 9. Facial plastic (Prof. Moure). The mouth is enlarged on the left side in order to enable the dentist to take an impression.

Feb. 16, 1916. Another plastic operation (Prof. Moure). The cheek scar is reopened in order to pad and to raise it.

June 24. Plastic of the face (Prof. Moure). Lateral incision starting from the left labial commissure in such a manner as to remove the cicatricial tissue on the inner surface of the cheek and of the lip. It is also found that the whole old cavity is filled with fibrous tissue.

The labial commissure is incised by separating the fibrous tissue adhering to the maxilla from the mucous membrane of the cheek. A portion of this very dense cicatricial tissue is removed in order to make the wall thinner and to suture the mucous membrane at the level of the commissure. The mouth can thus be opened halfway, which makes it possible to insert on the right a dilating apparatus which is left in place.

March 31, 1916. The tongue is freed from adhesions on the left side, and two separate levels are found, a lingual one and the other on the floor of the mouth.

For several months I have not seen this man who later was fitted an artificial hard palate and artificial teeth.

We have here a very serious traumatism, very mutilating wounds affecting the soft parts and the bony framework of the face which was, however, reconstructed in a very decent way so that the unfortunate man is not an object of horror as he was before.

Many other such cases could be mentioned. They are now well known to the medical profession since there are in France several colleagues who make a specialty of these reconstructions and obtain truly interesting successes in apparently hopeless cases.

We must, however, remember that the role of the surgeon is not only to reconstruct the facial outlines of the patients but also to maintain or even to reconstruct the patency of the orifices or of the natural channels which are often narrowed or closed by the wound.

We should also note that very often a facial wound well attended to, cicatrizes of itself under truly extraordinary conditions in such a manner that it is well, as I have said before, to attempt to bring together as soon as possible, the mutilated or displaced parts. On the other hand, however, we must not be too hasty in making too early a reconstruction, for nature sometimes brings us surprises even in apparently very serious cases.

Furthermore, if after an operation a badly cicatrized wound becomes badly keloidal, we must not hesitate to remove this new-formed tissue, which is almost always dense and retracted and which may prevent a satisfactory facial plastic. We should not forget that the skin has the advantage of being very elastic and of lending itself to sliding plastics if we know how to make use of it.

One of my assistants and co-worker (Dr. Pietri) will later publish a plastic method which I have used from the beginning of the war, and which has given perfect results without the necessity of borrowing new tissue from the neighboring soft parts, from the thigh or buttocks, in order to graft it upon a defective cicatrix.

We should not forget the good effects of massage under hot air, ionization, or even X-rays in order to render certain dense and adherent cicatrices pliable.

I mention once more the good influence of the iodid and even biniodid treatment in certain cases where the tissue is of such a poor character that repair is slow and poor.

TREATMENT OF THE MOST COMMON MUTILATIONS OF THE NASAL TIP STRUCTURES (AUVENT NASAL), CAUSED BY WAR TRAUMATISM.*

BY HENRI CABOCHE,
MAXILLOFACIAL SERVICE OF DR. PIENE SEBILEAU,
HOPITAL CHAPTAL.

It is proposed in this study to complete and enlarge upon the communication made several months ago, before the Société de Chirurgie, in collaboration with Dr. Sebileau (Bull. et mem. Soc. chi. de Par., March 20, 1917), who has entrusted to us the surgery of this region in his service at Chaptal Hospital.

"The 'auvent nasal,' as we stated in that paper, "is that supple and mobile cartilaginous portion of the nose which borders the frontal processes of the maxillæ and the nasal bones proper, which supports the anterior and inferior borders of the quadrangular cartilage (septum and columella), just as the ridge piece sustains the roof, beneath which the nasal orifices pass in, and whose two wings unite below and in front to join the lobule." Its lesions are among the most important of the nasal pyramid. They are also very varied.

Classification.—Destruction of the "auvent nasal" may be total or partial.

In total destruction, the lobule of the nose, the cartilaginous septum with most of the columella and the alæ, have disappeared. Hence, all of the nasal pyramid situated below the bones proper is level with the submalar plane. The remains of the alæ and columella, contracted by cicatrization, become attached, the first more or less obliquely to the circumference of the pyriform orifice, the second to the anterior border of the septum, which appears in the form of a ridge extend-

*Translation made in the office of the Surgeon-General of the Army from the original which was published in *La Restauration Maxillo-faciale*.

ing vertically between the bones proper and the anterior portion of the floor of the nasal fossa. The mutilation reproduces the picture of the nasal skeleton, the flat nose (Fig. 1). There is a form of total destruction (extremely important, because it necessitates, as we shall see, a special treatment) in which, contrary to the description just given, the cutaneous columella has entirely disappeared. This form includes a more extensive destruction of the septum in the frontal plane; its vertical ridge appears more deeply buried in the interior



Fig. 1. Soldier Por.



Fig. 2. Soldier J.

of the nasal fossæ, its insertion is more remote from the anterior portion of the floor; finally, the cartilaginous element which enters into its construction is very much reduced in proportion to the bony element, which exists only in the anterior portion (Fig. 2).

PARTIAL DESTRUCTION.

Partial destruction may be divided into four principal types:

1. Destruction and flattening of the dorsum of the nose with displacement of direction of the vestibule. The destruction

has chiefly involved the middle portion of the "auvent" (between what might be called its substructure and the nasal bones). The anterior part of the quadrangular cartilage is destroyed as in total destruction and its border becomes vertical. In its lower portion (columella, alæ and lobule) it has simply been torn from its deep attachments. Drawn upward and backward by the cicatrization, in the frontal plane, it is placed in such a manner that the nostrils no longer face downward but directly forward. It is rare, however, for the destruction to be so schematically regular.



Fig. 3. Soldier Pill.

Frequently one of the nostrils is entirely preserved with the lobule intact, while the other is sectioned and more or less destroyed. The lumen of the preserved nostril does not face directly forward, but forward and laterally, the lobule covering more or less the nostril of the opposite side, already contracted by a vicious adhesion of the sectioned ala. (Fig. 3, 4, 5, 6.)

2. Destruction of one ala of the nose. Lobule and columella are preserved. In a few cases, which appear to us excep-

tional, the ala has been completely destroyed. At present we are not concerned with the variety. Generally a rudiment of ala exists near the nasobuccal furrow. (Fig. 7, 8, 9.)

3. False direction of an ala.—Septum, columella and ala are preserved in their form. But the lesion has affected the "auvent" outside the median line, above the ala, and by the cicatricial retraction the ala has sustained a more or less considerable upward movement, exposing the vestibular septum. (Fig. 10, 11.)

4. Isolated Destruction of the Columella.—This form rarely



Fig. 4. Soldier Pill.



Fig. 5. Soldier Pr.

presents itself, according to our observation. This lesion is generally the upward extension of a destruction of the upper lip. The treatment of this will not be considered at present.

Is there need to say that this classification is of necessity schematic and is intended in no way to comprise the entire scale of lesions which may be brought about by war traumas?

TOTAL DESTRUCTION.

The reconstruction of a nasal "auvent" comprises the two following operations: (1) Creation of a nasal ridge and col-

umella; (2) application, on this support, of a layer of cutaneous covering. This is the procedure that we have devised, as described in the paper before the Société de Chirurgie previously mentioned.

1. CREATION OF A NASAL RIDGE AND COLUMELLA.

It has appeared to us simple to find the tissues necessary in the remaining portion of the nasal septum, even when the latter is buried in the interior of the nasal fossæ. For this purpose we cut from the septum a large flap having the form of a right angled



Fig. 6. Soldier Pr.

triangle. The longer side of the triangle corresponds to the insertion of the septum on the nasal floor; it is therefore inferior. The shorter side is the free border of the partially destroyed septum, and is therefore anterior. The hypotenuse extends approximately from the point where the septum is inserted between the two nasal bones proper, as far as the floor of the nose, where it joins the longer side of the triangle; it is therefore superior. The three angles of this triangle are consequently anteroinferior, anterosuperior and postero-inferior. However, the anteroinferior angle does not come in the same vertical line as the anterosuperior angle, and re-

mains on a posterior plane; in fact, in cutting the large side of the rectangle one should stop the section of the septum before reaching the anterior border of the latter, stopping at a point about a half centimeter from the edge of the cartilage. This half centimeter forms a sort of hinge pedicle around which the flap is made to swing in the sagittal plane in such a manner that:

- a. The long inferior side becomes posterior;
- b. The short anterior side becomes inferior and forms the columella;



Fig. 7. Soldier E.



Fig. 8. Soldier C.

- c. The hypothenuse above becomes anterior and forms the dorsal ridge of the nose.

In this way there is constituted a sort of support whose posterior angle, now superior, insinuates itself on the nasal bones proper, to the periosteum to which it is fixed by a few catgut sutures. (Fig. 12, 13.)

The cutting of this support is delicate; it is facilitated by the instruments which we employ. The septotome which we have had made (Caboche) is a sort of fine lanceolated bill-hook, whose long and stout handle is provided with a heel,

and whose thin blade presents a keen point and two concave and opposed edges. (Fig. 14.)

The point of the instrument punctures the anterior segment of the cartilaginous septum, slightly behind the future pedicle. It is pushed from before backward, keeping close to the nasal floor, until a resistance, not to be mistaken, indicates that the anterior border of the vomer is reached. A few blows with the palm of the hand on the heel of the handle permit the detachment of the vomer to a sufficient extent. The section



Fig. 9. Soldier C.

of the hypotheruse, which ought to fall at 45 degrees on the floor of the nasal fossa, is made preferably from behind forward, either with the bistoury, with simple scissors, or with the excision forceps of Mahu mounted on the universal handle of Bruneau.

2. THE APPLICATION OF A CUTANEOUS COVERING.

Over the cartilaginous support, and intended to be supported by it, we apply then two lateral, symmetrical, rectangular flaps, cut in the cheek obliquely downward and outwardly, whose pedicle, internal and above, is situated more or less near to the

orbitonasal angle, according to needs. These flaps, which are provided with a good vasculocellular base, have excellent vitality; they are of reducible thickness, which gives much elasticity to the operative technic; finally, they are moldable and plastic. We suture them to one another in the median line by their inner borders; by their outer borders they are united to the remains of the wings of the nose previously liberated and brought into good position. On their deep surface they are applied to the reconstructed septum and are inserted between

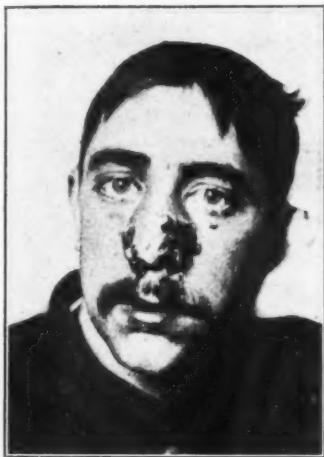


Fig. 10. Soldier P.



Fig. 11. Soldier P.

the edges of the depression made for them by the liberation of the remains of the lateral cartilage of the nose and resection of scar tissue. By their free inferior border the flaps are called upon to restore the lower contour of the vestibule of the nose in conjunction with the remains of the alæ (Figures 15, 16, 17). Above they are left all their thickness, so far at least as this allows making them even with the neighboring cutaneous plane. (This leveling is of primary importance for the esthetic appearance of the future nose; we do not hesitate to sacrifice deliberately from each side a part of the healthy cutaneous flap when without this excision the flap

would superimpose at the point of crossing the upper part of the pyramid to meet its fellow in the median line. We thus create a depression in which the flap is inlaid and thanks to which no inequality of surface of our reconstructed nose exists. Figure 16 shows to the left this gutter in dotted lines; to the right the excision has been performed.



Fig. 12.



Fig. 13.



Fig. 14.



Fig. 15.

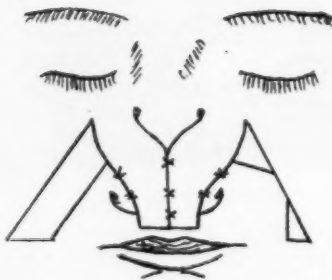


Fig. 17.



Fig. 16.

Below, we slightly thin out the flaps in such a way that they may, in being turned, form of themselves a sort of seam limiting the border of the nose. It is here that normally retraction takes place. It is here only, at this lower border, that the vitality of the graft sometimes is questionable, so that we take

the precaution to leave this end of the flap free and floating for the first day or two, placing no suture, no retention and no doubling over; not even a drain or gauze wick in the nasal fossa, which would compress the flaps by raising them up. We used this method successfully in the soldier Por. (Fig. 1, 36, 37, 38.)

The preceding technic assumes that the traumatism has respected the quadrangular cartilage near the root of the columella in sufficient quantity to allow its incision for the forma-



Figs. 18, 19, 20.



Fig. 21.



Fig. 22.

tion of the hinged pedicle of which we have spoken. The most favorable conditions are realized when a portion of the cutaneous columella persists and brings to the pedicle its nutrition through the artery of the columella.

In less favorable cases, which we mentioned in the classification, where the columella has entirely disappeared and the lower part of the cartilage is totally destroyed, the large base of the septal flap must be entirely composed of the vomer. Under these conditions, in order that the swinging of the flap

may be possible, it is necessary that the vomer be detached from the floor of the nasal fossa to its origin at the nasal spine; but then our flap would not keep any attachment to the floor and would become free.

We then operate in the following manner: At the anterior and inferior portion of the septum we detach on both sides the mucous membrane which covers it over an area of about one centimeter, and we extend on each side the detachment on the floor of the nasal fossa, outward as far as possible to-



Fig. 23. Soldier Pill.

ward the inferior meatus. Incising then each of the two mucous flaps thus obtained at the end of their zone of adhesion (vertically near the septum, horizontally and transversely on the floor) we thus form, artificially in a way, a mucous pedicle formed of two bilateral flaps extending from the inferior meatus to the anterior portion of the vomer, a pedicle which will bring to the segment the vascular elements necessary for its nutrition, and which will allow it later to swing between its two constituent flaps. (Fig. 18.)

The resection of the vomer is made with the electric or dental engine in the region corresponding to the pedicle (sub-

mucous resection) to avoid the cracks made by the chisel. In the remainder of its extent the resection is performed with the engine if possible; if not, by the septotome handled like a chisel, great care being taken to keep the mucous membrane belonging to it adherent to its two surfaces (transfixion). The hypothernose is sectioned as previously described.

The flap being swung and put in good position, there still remains its fixation. While in favorable cases, where one has been able to form a chondromucous pedicle, simple suture of



Fig. 24. Soldier Pill.

the top of the flap to the periosteum of the nasal bones proper suffices for this purpose (besides its nutrient rôle, the hinged pedicle, by its continuity with the substance of the flap and by its elasticity which tends to carry it backward and to buttress in a way the flap on the nasal bones proper, plays a most essential rôle of retention). This does not apply in cases where one has had to rely on the mucous pedicle, whose rôle is purely nutrient. In this case we fix the top of the septal triangle between the two previously dislocated nasal bones.

By means of a bone forceps, each of the nasal bones is dislocated outwards. Having thus opened them like a book, we

introduce the upper end of the flap in the interval between them, and we pass from side to side a catgut suture through the nasal bones and the flap, which have been previously perforated with an engine bur. The nasal bones are pressed down in the median line before the catgut is tied over them.

Nothing remains but to apply to the support, thus set in place, the cutaneous covering made from the two flaps, which we have just described. This technic has been utilized twice successfully. The patients are still under treatment.

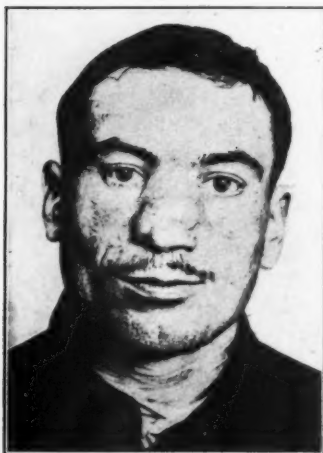


Fig. 25. Soldier Pill.

The operation whose different stages have just been described must only be undertaken after good assurance of the quality of the cartilaginous septum; it should not be attempted if the septum is soft in a large part of its extent, or if it is perforated, conditions which render impossible the formation of the flap. (This determination is sometimes difficult; a septum apparently healthy to rhinoscopy, on operation was found to be the seat of several abscesses, which were the cause of failure.)

The operation is not without difficulty. By reason of its hemorrhagic character from the necessity of resecting scar tis-

sue and attacking the very vascular nasal mucous membrane, blood flows abundantly into the nasal fossæ, making cricothyroid laryngotomy with anesthesia absolutely necessary.

It is unnecessary to say that before undertaking this cosmetic restoration, it is necessary, by treatment or by a preliminary operation, to reconstruct and assure the permeability of the nasal respiratory passage.

This method was employed in the case of the soldier Cor. As shown in Fig. 8 and 9, there was almost complete destruction of the right ala (with the exception of the lower portion of the root) and of the septal end of the left ala, which were in the most part preserved.

The right ala was repaired after the manner indicated. The left ala was lower after incision of the tissues which held it. The loss of substance resulting from this liberation was sup-



Fig. 26.



Fig. 27.

plied by a cheek flap, with orbitonasal pedicle, turned ninety degrees, and well applied after having deliberately sacrificed the skin of the bridge of the nose which, although healthy, opposed its perfect adaptation.

The esthetic result was very favorable. The sutures unhappily became the seat of a tuberculous process, particularly along the median line, where there was at the time of operation a small ulcer of the septum. In order not to favor the local process by diminution of the blood supply, we decided to postpone the section of the left flap (Fig. 28 and 29).

FLATTENING AND DESTRUCTION OF THE NOSE, WITH FALSE DIRECTION OF THE VESTIBULE.

The operation comprises the following stages:

1. Destruction of the scars and liberation of the remains of the alæ of the nose and the lobule, in such a way as to be able to give each of these parts their natural position.

2. Creation of a nasal bridge by means of the septal flap previously described.

3. Application on this bridge of cheek flaps of shape and dimensions appropriate to the loss of substance resulting from the liberation performed in the first stage.

The case of Private P., shown in Figures 3 and 4, illustrates very well this type of deformity. Section of the septal flap was made, as in the cases of total destruction, with partial preservation of the columella—i. e., by transfixion. After

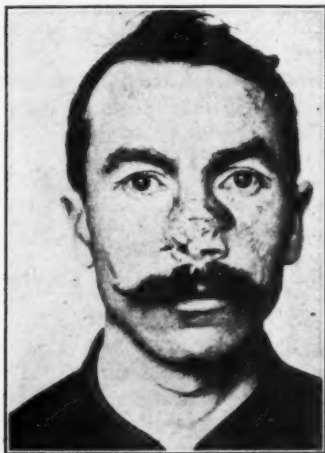


Fig. 28. Soldier C.

swinging the flap, its anterior border, now inferior, was applied to the fibrocutaneous mass of the columella. As to the cheek flaps, they were cut with an orbitonasal pedicle as for total reconstruction (Figure 21), but their method of adaptation was necessarily different on the two sides.

On the left side, for the purpose of preserving the nostril and lobule, the flap was twisted almost 90 degrees. The end opposite to the pedicle (which might be called its base), instead of horizontal became vertical and was carried to the median line; the outer side, oblique below and outward, became horizontal and inferior, and was sutured to the upper

part of the left ala; the inner side became horizontal and superior and was sutured to the skin covering the nasal bones (Figure 22).

On the right there existed only a small portion of the root of the ala of the nose; the flap was simply swung around its pedicle, after the manner of a pendulum around its point of attachment. Its inner border, brought close to the median line, was sutured there to the base of the opposite flap above and with the left side of the lobule below. Its external border was



Fig. 29. Soldier C.



Fig. 30. Soldier E.

sutured to the remainder of the ala on the right side; and its length was trimmed so that its lower end extended appreciably below the lobule and the ala (Figures 21 and 22).

Several retouches were made to turn in this end and to fuse it with the neighboring parts internally and externally.

Aside from the keloid scars, which the patient already presented before the operation, and which it has not been possible for us to avoid, the esthetic result, as shown in the appended photographs, was satisfactory. The root of the nose remains broadened on account of the traumatic separation of the nasal bones (Figures 23, 24 and 25).

DESTRUCTION OF ONE ALA OF THE NOSE.

3. Destruction of One Ala of the Nose.—With the disappearance of one ala of the nose we seek, for its reconstruction, to utilize the cicatricial edge of the traumatic breach as free border of the future ala. We trace therefore a rectangular flap, with pedicle corresponding to the cheek, at the site of the nasofacial furrow. Of the three other sides of the flap, the inferior one corresponds to the cicatricial border of the loss of substance and extends from the lower part of the nasobuccal groove to the nasal bridge (it comprises generally a minute vestige of the root of the ala); the second, parallel to the preceding, extends from the upper end of the pedicle to



Figs. 31, 32, 33.

the nasal bridge, crossing a few millimeters below the infero-internal angle of the orbit; the third, vertical, joins on the bridge of the nose the two nasal ends of the preceding. This side does not exactly follow the nasal bridge; it extends a few millimeters beyond it.

This flap, dissected with its deepest layers, is then lowered by making it turn around its pedicle like a hinge, in such a way that its lower border has a direction symmetrical with that of the opposite ala. Its paramedian border is sutured from below upward to the lobule and the crest of the pyramid, its upper border is sutured to the periosteum of the free border of the nasal bone (the height of the flap has been calculated in such a way that after lowering it, this suture is possible); its lower border becomes the free border of the ala of the

nose. When the skin of the patient is thick and resistant, when the vestibular septum is not deviated, when, in a word, atelectasis of the flap or atresia of the nostril is not to be feared, this procedure suffices.

We used this method on the soldier E. (Fig. 7). The immediate result was excellent. A slight sphacelus of the nasal border of the flap resulted, the consequence of which was a slight ascension, with inequality of the new ala, as compared

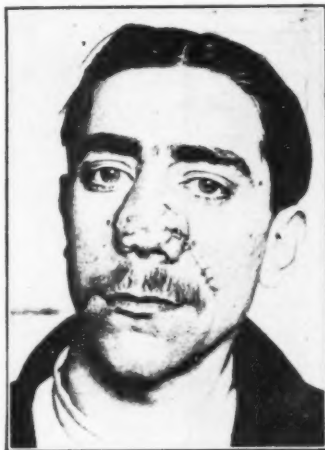


Fig. 34. Soldier P.



Fig. 35. Soldier P.

with that of the opposite side. However, his condition was sensibly improved.

When, on the contrary, on account of the thinness of the skin, there is cause to fear aspiration of the flap when put in place, or when a deviation of the septum renders functional insufficiency of the newly formed nostril likely (as seen in Soldier E., Fig. 7), we introduce into the flap a fragment of cartilage which we cut if possible in the shape of a groove facing the vestibular cavity.

The flap is traced as previously described. At the moment when, in the dissection, the lower edge of the nasal bone is reached, we detach with a spatula the fibromucosa covering

the bone on its deep surface, and continuous below with that which covers the flap. This is then sectioned under the nasal bone as high up as possible.

When the dissection is completed, there is therefore obtained a rectangular flap covered on its deep surface with a fibromucous layer which extends beyond its upper border. The flap is split by cleaving from above downward a space between its tegumentary and fibromucous layers. There is thus obtained a sort of sac open above, the bottom of which is formed of



Fig. 36. Soldier P.

the lower edge of the flap, and in which the cartilage is placed. The sac is then closed by a few sutures at its upper portion; then the flap is sutured, as previously, on the inner side to the lobule and at the crest of the nasal pyramid, and above to the periosteum of the free border of the nasal bones.

THE DISORIENTATION OF THE ALA OF THE NOSE.

Figures 10 and 11 show the condition in Soldier Pou., some time after the wound, giving only an imperfect view of the lesion at the time of operation (through an oversight no photograph was made during the cicatricial period).

This was a case of marked ascent of the ala of the nose, its free border took the form of a curve with large radius, concave below and widely exposing the septum, the opening of the nostril directed in a very disfiguring way forward and outward. In this case again, the cheek flap easily corrected this deformity.

An incision is made following the scar, usually in a horizontal direction. This incision passes only to the fibromucous layer. A division is then made above and below the incision,

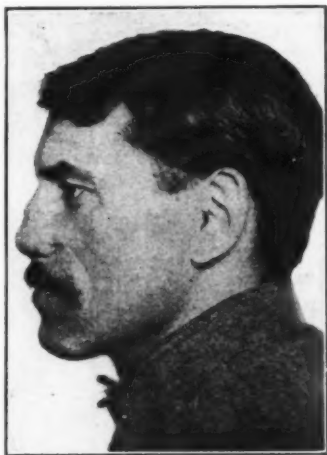


Fig. 37. Soldier P.

between the cutaneous and the fibrous layers, which is carried as far as the edge of the nostril and above to just beneath the nasal bone. In sectioning the fibromucous layer, following a horizontal direction, as high as possible underneath the nasal bone, there is obtained, as before, a flap entirely fibromucous at its upper part, fibrocutaneous at the site of the ala, and thanks to which this latter is lowered and placed easily in good position, the upper fibromucous edge of the flap. In suturing to the upper cutaneous border which results from this liberation of the ala, there is obtained for the covering flap which we next apply, a sort of bed, whose lower border

corresponds to the upper border of the lowered ala, and whose upper border to the position of the old scar, and the bottom of which is occupied by the fibromucosa which lies above the ala.

The cutaneous covering flap is cut vertically or more or less obliquely below and backward, in the region of the nasobuccal furrow. Of appropriate size and shape, its disposition should be such that its pedicle does not go beyond a horizontal line passing through the upper edge of its bed, while its anterior edge crosses the posterior part.

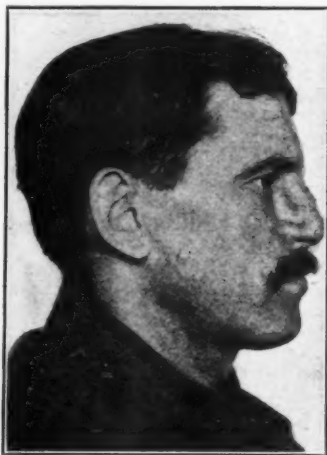


Fig. 38. Soldier P.

After swinging the flap upward at an angle of 90 degrees, its anterior edge, now superior, and its posterior edge, now inferior, are sutured to the corresponding borders of the lost tissue. Thanks to the disposition of this flap, the pedicle disappears entirely in the torsion, so that no secondary section is necessary (Figures 31, 32, 33).

Figures 34 and 35 show how satisfactory is the correction of this deformity. If the sutures are properly placed, but a short time will intervene between the operation and the recovery of the patient.

These are the types of procedures employed for the repair of the principal lesions of the tip structures of the nose observed by us. Their use, particularly in connection with total lesions of the septal portion, is attended with some difficulty and requires sufficient knowledge of rhinologic technic from the standpoint of the biologic value of the septum as much as the execution of the operation itself. Considering that surgical esthetics are less difficult of appreciation than general esthetics, we believe that we can say that our results in the main have been satisfactory and that they justify the publication of our article.

LXXIII.

RHINOPLASTY AND NASAL PROSTHESIS.*

By PONT,

CHIEF OF THE STOMATOLOGIC CENTER OF THE XIV REGION.

When there is a loss of a part of the nose, whatever may be the cause, two methods of treatment are to be considered: rhinoplasty and prosthesis. Before sketching rapidly the evidences of the indications for one or the other, it is well to admit that theoretically the rebuilding of a nose by rhinoplasty, provided that the result is neither deplorable nor ridiculous, is always to be preferred to prosthesis. The latter, ther., should be employed in only three conditions: 1. When rhinoplasty is impossible or contraindicated. 2. When rhinoplasty will not give satisfactory esthetic results. 3. As a temporary measure, either before or during the different stages of surgical treatment.

We have no intention of giving here the historical account of rhinoplasty and the description of the different methods which have been employed in turn. All of this has been described in another connection in the treatise on rhinoplasty by Nelaton and Ombredanne. At the present time rhinoplasty by means of a cartilage graft is the method chosen. This has found wide use since the war. It is because we have had occasion in the center of maxillofacial surgery at Lyon to observe numerous cases of nasal traumatism and loss of substance that I have thought it useful to give here a few observations on rhinoplasty and nasal prosthesis as well to complete the presentation which I have already made on this subject from the standpoint of the service which can be rendered us by prosthesis or rhinoplasty when their indications are judiciously examined and applied.

When there is a case of tubercular, syphilitic or cancerous lesions the general or local condition very often stands in the

*Translation made in the office of the Surgeon-General of the Army from the original which was published in *La Restauration Maxillo-faciale*.

way of any treatment which causes bleeding. Likewise prosthesis only can be employed in the case of extended burns of the face where the bad condition of the tissues of the frontal and cheek regions does not justify a hope of sufficient nutrition or vitality of the flaps. It is in this connection that I have had occasion to use prosthesis in the cases of lupus, tertiary syphilis, cancerous lesions or extended burns.

I have published a certain number of these observations during the last five years. In all of the cases the patients were seen and examined by competent surgeons, who had decided that rhinoplasty was contraindicated.

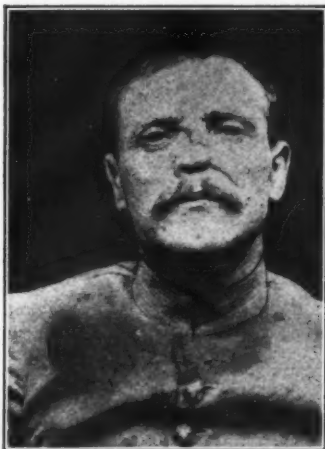


Fig. 1. Rhinoplasty made before the war. Result defective.

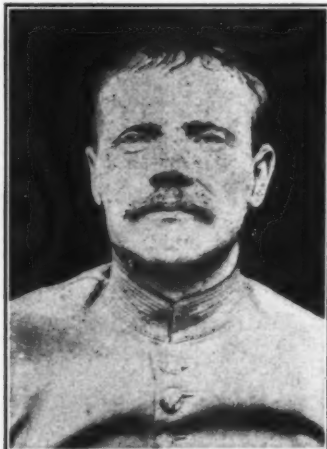


Fig. 2. Esthetic correction by plastic prosthesis.

As a result of what we have just said, the principal indication for the use of rhinoplasty is summed up in the cases of loss of substance by traumatism, and that is why rhinoplasty with a graft of cartilage has been indicated many times during these last three years. However, we have had occasion to observe large traumatisms of the face, accompanied by a loss of substance so extensive that rhinoplasty was not indicated,

except as a final measure or at least after a long time. Nasal prosthesis found application in such cases.

In spite of the skill of the operator and the improvements of surgical methods, failure may result, and we must fully understand that rhinoplasty does not always give results which are perfect from the esthetic point of view. In this connection one is reminded of the expression of Verneuil when a case of rhinoplasty was presented before the Academy of Medicine: "The patient was frightful before, and now he is ridiculous." This expression, I am sure, will find an application less and less; however, it is not less true that prosthesis will sometimes be substituted.



Fig. 3. Cast of S., showing loss of nasal substance.

Case 1.—I cite in this connection the case of Lieut. C— (Paul), forty-two years old. An old rhinoplasty had been done in 1911, after the Indian method, followed by the spontaneous expulsion of the metal frame through suppuration of the neighboring tissues.

This officer was wounded at Malancourt, February 25, 1915, by a fragment of a shell in the chin region, and was evacuated

to the Stomatologic Center at Lyon. The maxillo dental lesions were treated first and after they were healed attention was given to the nasal deformity.

As rhinoplasty had not given esthetically satisfactory results, we decided that it was useless to try a new treatment by autoplasty, and we constructed for this patient a nasal prosthesis in plaster which improves his facial appearance very greatly. (Figures 1 and 2).

Finally prosthesis will be of great assistance to avoid the crowding of our hospitals by allowing patients to be discharged as convalescents while waiting for rhinoplasty without suffering as objects of repulsion to their friends.



Fig. 4. Result after autoplasty.

In brief, rhinoplasty in the case of a loss of nasal substance by traumatism is especially seen to be proper and ought to be used save in exceptional cases. It is useful at the present time to lay stress on this point and to put its indications clearly in evidence.

Before presenting the patients upon whom I have made rhinoplasty with cartilage grafts, I have the honor of showing

you, in the name of Professor Collet as well as in my own name, the patient S—, a study of whom proves that in partial losses of nasal substance it is not always necessary to use a cartilage graft. By the old method of doubling over the skin satisfactory results can be obtained, as in the case of this patient.

Case 2 (Figures 3 and 4).—S— (Pierre), twenty-five years old, 35th Regt. Inf., bullet wound Sept. 25, 1915, at Souain. The projectile penetrated a little behind the lobe of



Fig. 5. The loss of substance before rhinoplasty.

the left ear in a spot scarcely perceptible at the present time and emerged on a level with the nasal bones.

From the maxillo-dental point of view there was found a fracture of the neck of the left condyle with lateral deviation of the inferior dental arch towards the left side.

A comminuted fracture of the nasal bones with loss of part of the dorsal surface of the nose over an extent of about 2 cm.

A crushing wound of the right thigh in the lower third had made amputation of that member necessary. A rhinoplasty was proposed with cartilage graft from one of the costal

cartilages. The patient on account of his amputation refused to allow the graft to be taken and he was sent to the orthopedic center of the 14th military district. He was finally admitted into the service of Professor Collet, who was willing to intrust him to me.

On January 25, 1916, under a general anesthetic, a deep flap was made at expense of tissues adjacent to the opening and a superficial flap was cut from the forehead intended after



Fig. 6. After rhinoplasty.

turning to form the outer surface. The results were normal without general or local reaction.

On Nov. 3, 1916, a dental prosthesis was applied; Nov. 8, under local anesthesia, a second operation was done to correct the pedicle. The frontal wound healed normally and the scar is scarcely visible.

I now present two cases of rhinoplasty with cartilage graft, the first made in the case of a patient who had lost the entire middle portion of the nose.

Case 3 (Figures 5 and 6).—Th—— (Pierre), thirty-two years old, wounded by shell fragment April 22, 1916, at Avon-

court, showed a loss of substance and a depression of the dorsal surface of the nose with a comminuted fracture of the nasal bones; the tip was drawn up and held by an adhesion.

Aug. 9th, 1916, under general anesthetic cartilage graft for subsequent rhinoplasty.

October 11th, 1916, rhinoplasty under general anesthesia. 1. Incision permitting the tip of the nose to be lowered back into its normal position; two small lateral flaps turned back to constitute the deep layer. 2. A frontal flap containing the



Fig. 7. R., on his arrival at the Maxillofacial Center at Lyon.

graft was pressed down on the dorsal surface and sutured to the tip. The results were normal.

The second case, as the figure shows, exhibited a loss of the substance from the upper lip and an almost total loss of the nose except the left outside ala wall.

Case 4 (Figures 7 and 8).—R— (Jean Baptiste), twenty-five years old, 114th Regiment of Infantry, was wounded in the face by a shell fragment May 18, 1916, at the Hill 304.

Condition on Admission.—Traumatic section of the upper

lip assuming the form of a median harelip, accompanied by the destruction of the lower portion of the septum and a cicatricial atresia of the nares; fracture of the superior maxillary with traumatic abrasion of eight teeth; fracture of the septum and probably of the vomer with loss of the dorsal portion of the nose; wound of the left frontal region and the left middle portion of the masseteric region.

Treatment.—On his arrival at the Stomatologic Center May 21, 1916, the nasal chambers and buccal cavity were



Fig. 8. Result following cheiloplasty and rhinoplasty.

washed antiseptically, care being taken to distend the nostrils by means of drains kept immovable.

July 31, 1916, under general anesthesia an autoplasmic operation was made on the upper lip. Dressing, no reaction following the operation, I decide to make a rhinoplasty with cartilage graft in a second series of operations.

September 1, 1916, removal of a costal cartilage of the left eighth rib. This graft was inserted under the skin of the forehead to the right of the left frontal wound, after removing the skin. No reaction.

The second part of the operation not being possible for two months, the patient was discharged as a convalescent for two months.

November 24, 1916, on his return from his convalescent period, rhinoplasty was performed. 1. Transverse incision of the dorsal surface of the nose to allow the tip to be straightened.

Two strips of skin were cut from over the nasal bones to constitute the deeper layer, the lower surface being continuous with



Fig. 9. Ch. Belgian Corporal repatriated from Germany after rhinoplasty.

the nasal mucosa. The nose was kept open by means of two large drains. 2. A frontal flap containing the graft was made and after being turned around 180 degrees was drawn down on the dorsal surface of the nose and sewed in a good position; ordinary dressing.

No reaction, local or general. A third operation was still necessary to divide the pedicle, in order to give the nose an esthetic form.

In consequence of the size of the frontal flap it was not

possible to cover the loss of substance by bringing together the edges of the wound. This wound, however, closed by the first intention without leaving a marked scar.

February 26, 1917, under general anesthetic the pedicle was corrected and thickened skin bud excised.

Likewise a slight cheiloplasty was necessary to remove an external cicatricial band. It is well for the sake of completeness to show the different methods of nasal prosthesis. But I have already had occasion several times to discuss this ques-



Fig. 10. The same in profile.

tion, and I will not return to it. I have presented, in turn, nasal, auricular and oculo-facial prosthesis, made by the plastic method. I should say, however, that in spite of all its advantages this method presents a certain inconvenience. The patient, especially when there is a case of nasal prosthesis, is obliged to recruit his strength for three or four days after putting on the artificial nose; therefore, in spite of the facility and rapidity with which this can be done many of these men carelessly wear their prosthesis exceptionally and thus the purpose in view is not fully attained. I have, therefore, sought to improve this method. I perform on my patients not only

the operation necessary for the models in plaster, but also a model in wax similar to the one which I am going to demonstrate to you in the case of a Belgian soldier who was returned to his country from Germany.

By recourse to the plastic method, I give my patients an appliance which lasts a short time, but is very esthetic. The second appliance is a "working appliance" which he can put on in the morning as easily as if he were putting on a pair of spectacles and which necessitates no special cost for repair.



Fig. 11. Ch. with prosthetic appliance.

This appliance may last several years if the patient is careful.

Case 5 (Figures 9, 10, 11 and 12).—Ch——, Belgian subject, twenty-four years old, wounded October 20, 1914, by a bullet which caused a total loss of the nasal substance and of the left half of the upper lip. He was dressed by the enemy and taken into captivity, but was sent back to his own country on May 19, 1916, and removed immediately to the Stomatological Center at Lyon. In Cologne he submitted to rhinoplasty by means of triangular strip from the middle of his forehead together with a graft from the tibia.

The upper lip was divided and restored imperfectly moreover by autoplasty. August 23, 1916, an operation was performed by Dr. Pont in order to reform the left labial commissure and to re-establish buccal occlusion. As the rhinoplasty undertaken in Germany had not given satisfactory results from an esthetic point of view, the patient was not willing to submit to other surgical operations, so we had recourse to a prosthesis.

The appliance which I have the honor to present to you is



Fig. 12. Appliance in profile.

made of a composition of vegetable and animal wax. It is not yielding but somewhat pliant without being broken. It is held on by spectacles. Its lower part, continuous with the lower septum, covers over half of the lower lip. An artificial moustache has been applied to hide the place where the prosthesis and lip come together.

The results from an esthetic point of view give entire satisfaction to the patient.

In recapitulation, rhinoplasty with a graft of cartilage, which is the method of choice, will always be preferable to the most

perfect and most esthetic prosthesis. The latter, however, will be indicated by the conditions in three cases:

1. When rhinoplasty is impossible or contraindicated.
2. When rhinoplasty does not give an esthetically satisfactory result.
3. As a temporary measure either before or during the different stages of surgical treatment.

Prosthesis by a plaster cast for which I gave the formula five years ago may be considered the prosthesis for "days of rest"—it is necessary for the patient to change the appliance often, for which reason I have made in addition a more resistant prosthetic appliance which may be called the working prosthesis.

I believe, therefore, that by this new method I have done away with the inconveniences and objections which might have been raised against the plaster prosthesis. Henceforth we can make it possible for wounded men who have not been able to take advantage of the benefits of rhinoplasty to assume their former occupations and live their normal life.

ABSOLUTE REPOSE OF THE JAWS AS A TREAT-
MENT FOR TRAUMATIC PAROTID
SALIVARY FISTULÆ.*

BY PETER PIETRI,

HEAD OF THE SECTIONS FOR OTORHINOLARYNGOLOGY AND
AUTOPLASTY IN THE FRENCH HOSPITAL AT KIEW.

In the *Revue de Laryngologie* for March 5, 1916, we published an initial work on the important question of the parotid salivary fistulæ, and we proposed immobilization or absolute repose of the jaws as the preferable treatment, the result of the experience acquired under the direction of Professor Moure, head of the Otorhinolaryngologic Section of the 18th Region. A new year has brought us new cases which, since all have been treated systematically in the same manner with success, urge us to return to our initial study for the review of maxillofacial prosthesis.

We agree with Morestin in considering a salivary fistula present when a permanent abnormal orifice connects the passages for the saliva with the outside.

Relatively rare in times of peace, salivary fistulæ are, on the other hand, quite frequent in times of war; history shows us that they have been from antiquity up to the present time a subject of constant study for the practitioner who is called upon to remedy them.

Galen, ignorant of the existence of the parotid gland, had already observed that in wounds of the cheek a clear liquid was discharged which might well be saliva, and that is all.

Fabricius, of Aquapendente, in an analogous case, tells us quite simply: "Whence it comes and whither it goes, surely I don't know."

*Translation made in the office of the Surgeon-General of the Army from the original which was published in *La Restauration Maxillo-faciale*.

Ambrose Paré wrote: "There was a soldier who had received a sword thrust across the superior mandible, and when the wound healed there remained only a very little hole near the conjunction of the inferior and superior mandible, not larger at most than the head of a pin, from which when talking or masticating, there came out a large quantity of very clear water, and I have oftentimes seen it."

When Stenon had discovered and described the excretory duct of the parotid gland a new era was soon established for treating parotid fistulæ and chiefly those in which the duct only was injured.

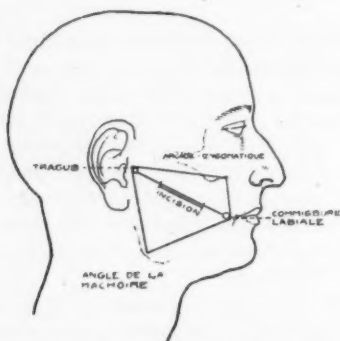


Fig. 1. Schematic plan for repair of Stenon's Canal.

The proceedings of the Académie Royale de Chirurgie, in 1757, have much to say about this question. Then followed in rapid succession the inauguration of new methods of operation, both in France and in foreign countries, by Deroy in 1760, Déjerine in 1811, Larrey-Désault, Vercy, Atti, Béchard, Gosselin, Trélat, Malgaigne, Lefort, Pozzi, Mollière, Richelot, etc. Finally, in these more recent years, the works of Fris, Coursier of Paris, Tussau of Lyons, Delarue of Paris, Joncour and Baillif of Bordeaux and many others, doubtless, whom I pass over without naming, by their number and diversity showing how difficult the question is to solve.

It is advisable to recognize two types:

- (a) The fistulæ of Stenon's duct ;
- (b) The fistulæ of the parotid gland proper.

The first affect only the extraglandular portion ; the second, on the contrary, affect the intraglandular part, which explains the great variation in the seat of the trouble which forms the subject of our study.

The extraglandular region of the parotid duct, or Stenon's duct, is the portion that extends from the anterior border of the parotid gland to the buccal orifice. Where it issues from the gland, Stenon's duct proceeds over the outer surface of the masseter, following a course somewhat obliquely upwards and forwards, drawing nearer to the zygomatic arch, from which

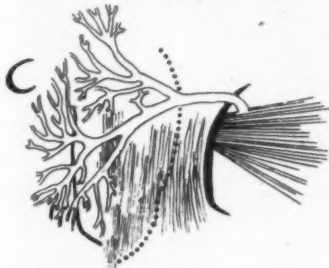


Fig. 2. Stenon's Canal and its principal branches after dissection.

it always keeps about a centimeter and a half away ; at the level of the malar bone this distance may be reduced to five or six millimeters. When it arrives at the anterior border of the masseter it encircles it and the fat-ball of Bichat, where it hollows out into a deep fossa. It finally returns on the external surface of the buccinator and, resuming in the interior of this muscle its original anteroposterior direction, it opens upon the surface of the buccal mucous membrane through a narrow orifice, the exact location of which it is difficult to determine, for it varies according to the individual ; nevertheless its most usual place is in the space between the first and second large molar. Application of a solution of cocain with ten per cent adrenalin to the mucosa renders the catheterization of it easier.

According to Baillif,¹ the region on the cheek that corresponds to the course of Stenon's duct is almost quadrilateral in form. "Its upper limit is marked by a line running slightly obliquely downward and forward, which follows the inferior border of the zygomatic arch and the malar bone. The inferior limit is marked by a line running from the labial commissure to the angle of the maxillary bone. The posterior limit is constituted by a line running somewhat obliquely downwards and forwards, which follows the posterior border of the ramus of the inferior maxillary. Finally the anterior limit is formed



Fig. 3. Wound of the face involving the parotid region and that of Stenon's duct.

by a line parallel to the posterior border of the quadrangle. The tragus lies at the posterior superior angle, and the labial commissure at the anterior inferior angle. The tragus and the labial commissure are two landmarks; a straight line between these two points shows the direction of Stenon's duct."

This quadrangle embraces two regions which are called the masseteric and buccinatory. We need not pay special atten-

1. Baillif: Thèse de Bordeaux, 1898-98.

tion to these if we are not operating on fistulæ of Stenon's duct; but we ought to mention them, for these two regions play a leading part in mastication and speaking; and our treatment depends on the absence of these two actions.

The direction of Stenon's duct is not always as precise as that just indicated. Baillif states that, in the investigations he made on the cadaver, under the direction of Professor Princeteau, he happened to find one instance in which the



Fig. 4. Site of the fistula in the posterosuperior portion not involving the excretory canals of the parotid.

direction followed a line running from the tragus to the ala of the nose.

Joncour¹ studied with care the intraglandular part of the parotid duct; like all anatomists who have studied the site of the parotid gland, he states that this gland is very irregular, and for this reason hardly to be designated by any well known geometric form. In the same person it may even present an absolutely different form on the right side and on the left.

1. Joncour: Thèse de Bordeaux, 1898-99.

As the original branches of Sténon's duct proceed from different parts of this gland we may form an idea of the varied character of their number and arrangement.

In order to study the intraglandular part of the parotid duct in detail, Joncour injected colored gelatin after taking care to dissect Stenon's duct somewhat at its buccal orifice, so as to fix firmly the point of his syringe by means of a ligature.

The excretory duct, he says, "as far as the course in the interior of the gland is concerned," shows numerous divergences.



Fig. 5. Mutilation of the face; the entire parotid excretory system involved.

Generally the intraparotid duct has an oblique course upwards and forwards, and its point of emergence is at the junction of the upper and middle third of the anterior border of the parotid gland. (Figure 2.)

Further the intraglandular median duct, which is quite superficial at the anterior part of the parotid gland, becomes deeper and deeper as it approaches its point of origin.

The diagnosis is self-evident. The history of the patient exhibits the nature of the trouble.

Actinomycosis, in particular actinomycosis at the entrance of Stenon's duct, and the lymphatic fistulæ of this region, to mention only these two affections, have characters clearly differentiated, and the regularity of the flow upon which mastication practically has no influence, or chemical analysis of the liquid secreted is sufficient to establish a definite diagnosis.

During the intervals between meals the condition is bearable, but when the least gustatory stimulation takes place, the



Fig. 6. Fistula in the middle third involving the entire parotid substance.

flow becomes truly a torture. The patient is really inundated and is required to put compresses over the opening of the fistula, which must be changed frequently on account of the abundance of the flow; he no longer dares to appear in public and condemns himself to an isolation which soon becomes harassing, so that he no longer dares to eat or to talk.

Certain authors, especially Morestin, have made investigations to find out how much of the liquid is secreted in the course of a meal.

Twenty to two hundred and eighty grams seem to be mod-

erate figures. Duplessis, for instance, was able to collect eighty-eight grams in eighteen minutes, and Duphoenix one hundred and twenty grams in twenty-eight minutes.

It seems clear, then, that salivary fistulæ, to which we are giving our attention, constitute a real infirmity by reason of interference with social life, not to mention the reaction upon the general condition in time; these justify all of the importance given to their treatment.

The prognosis of salivary fistulæ will vary according to the



Fig. 7. Transverse wound of the face with fistula of Stenon's duct.

site and direction of the wound caused by the producing instrument. The anatomic facts stated above show that a wound situated farther from the median main tract will affect quite a large number of collateral branches (Figure 3), while a wound in the upper or lower part of the gland will, especially if superficial, affect only canalicular branches of slight importance. These last are the fortunate cases; the external flow of saliva will be rather slight and spontaneous cicatrization comparatively easy. (Figures 4 and 5.)

If the wound is parallel to the principal parotid duct and

is situated a very short distance from it, the collateral branches proceeding from that portion of the gland will be affected above and below the lesion at the point where they unite into the main duct, and the saliva carried by these branches will flow externally instead of going down into the excretory duct.

As the flow of the saliva is produced abundantly during mastication, cicatrization will become very difficult if not impossible.



Fig. 8. Transverse wound of the face with punctiform fistula of Stenon's duct. Only by absolute fixation of the maxillary was it possible to stop the salivary secretion.

Let us assume that there is a vertical wound of the parotid gland; in this case the median duct will either be involved or not.

If the median duct is spared, the collateral branches involved will often be of little importance, and in all cases they will be rather few and the salivary flow from the gaping wound will be comparatively small and the cicatrization easy. (Figure 6.)

If, on the contrary, the traumatism includes the central duct

of the gland and destroys its continuity, the flow of saliva from the wound may be very abundant. (Figures 7 and 8.) All of the saliva poured down from the collateral branches above the intersection will continue to proceed towards the mouth to the level of the open wound through which it will flow. Further, as the presence of valves regulating the flow of the saliva in the excretory duct has not been demonstrated, a portion of this saliva collected by the collateral branches into the drain canal below the place of the traumatism will possibly flow



Fig. 9. Our dressing. The patient has a salivary fistula of the left parotid.

through the wound instead of being directed towards the mouth. Surgical intervention in this case, for example, in order to be successful, should endeavor to force the saliva poured into the canal behind the break in continuity to flow towards the mouth, and should also prevent at the same time the saliva poured into the anterior portion of the canal from flowing through this wound.

If the second part of the problem seems to be easy to realize, the first on the contrary appears impossible. The posterior

part of the gland becomes impaired and will continue to secrete and its secretion will prevent cicatrization, the result sought by the physician and so much desired by the patient.

Treatment.—The multiplicity of procedures proposed proves that none of them can be used in preference to the others for an assurance of cure.

In order to reduce the possibility of numerous subsequent procedures, it is well, in the succession of operations, to go from the simple to the complex. It is for this reason that the



Patient shown in Fig. 10 after the performance of Monre's genioplasty.

treatment applied by Professor Moure should be employed; it puts into practice the famous principle, alas! too often forgotten: *Primum non nocere*.

I have not found the procedure of the absolute repose of the jaws suggested in any of the papers which I have consulted on this subject.

The compression of the gland is advised by Maisonneuve,

whose method, although of little efficacy, is set forth at length by Rousseau.¹

Caustics and agglutinants—like the gold plate used by Malgaigne and Rodolphi's collodium—have had their day. For the sake of record, I mention also the compression of the carotid and the ablation of the parotid gland, without any comment.

Borel tells us of the ligation of Stenon's duct which was made by Viborg and which seems to have been accepted by Velpeau.



Fig. 10. Same patient as in Fig. 9 showing binding appliance.

The obliteration of Stenon's duct by a foreign body was the method proposed by Julliard who, in the *Annales médicales de la Suisse romande*, for 1883, reported good results by the introduction of salts of laminary into the canal.

Injections to produce atrophy were recommended in 1884 by Mollière of Lyon. He used phenolated oil, and a little later Settimio Cocchini gave preference to turpentine, either pure or mixed with olive oil.

1. Rousseau: Thèse de Paris, 1909.

The surgical procedures which depend on the source of the saliva remain to be discussed. The source is often illusive, for the permeability of Stenon's duct does not always follow with a pleasing result after intervention, so that one may often be right in thinking that Stenon's duct, buried in cicatricial tissue, has quite simply disappeared, as if it had been ligated.

I say nothing of these surgical procedures, thinking that before trying to change the course of the saliva, it is more logical to try to lessen its production.

It will be best to first diminish the production of this saliva as far as possible by the absolute repose of the jaws, through the agency of our mask (Figure 9), at the same time suppress-

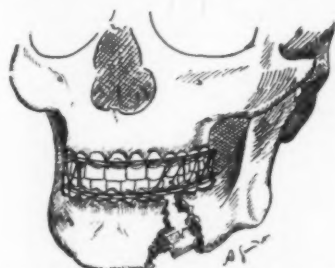


Fig. 11. Model of fixation appliance.

ing all gustatory sensation and putting the patient entirely upon a liquid diet for several weeks by means of a long tube, and imposing upon him absolute silence as far as possible.

Feeding is resumed afterwards gradually, beginning with porridges, pastries, milk foods, and eventually bread and food that require mastication.

The headpiece that we use is very simple. It is a sewed bandage which prevents opening the mouth. It is well to pad the regions connected with the ear, and sometimes also to arrange a pad of gauze on a level of the fistula. This mask shall be renewed whenever it is deemed advisable and immediately replaced by one exactly like it.

In certain cases accompanied by fractures of the maxillary it will be possible to combine with advantage the headpiece and the fixation of the jaws according to the method used with

success at the Stomatologic Center of the Eighteenth Region. (Figures 10 and 11.)

By limiting in this extreme and almost absolute manner the physiologic functions of the parotid gland and exercising a little patience, the fistula will dry up, then close or in case of failure there will still be time enough to employ the surgical procedure of choice to turn the course of the saliva which by its presence prevents the cicatrization of the fistula. (Figures 12 and 13.)



Fig. 12. Patient shown in Fig. 9 on arrival at the hospital. The saliva flows copiously from a crater like granulating wound at the slightest movement of mastication.

We do not know what happens to the parotid gland in the course of our treatment, but we think that it becomes adapted quite simply to the condition of repose, and when mastication is resumed, if the excretory duct is permeable, the normal function returns as the parotid gland on the opposite side. In the cases where there has been no infection, can we assume an atrophy of the gland? I do not think so.

The atrophy of a gland after the ligature of its excretory

duct comes about only very slowly, physiologists tell us, and there should be the same conditions in cases where a parotid fistula is little or not at all infected, while, on the contrary, in cases of parotiditis consequent upon traumatism, the destruction is rapid and permanent.

In most of the cases which we have had to treat, we think the glandular tissue proper becomes sclerotic and adheres firmly to the tissue framework which before had acted as a support pure and simple, but this is an hypothesis which histologists may verify.

Conclusion.—Can we say that this way of treating parotid salivary fistulæ by an absolute repose of the jaws is infallible? This is far from our opinion, in spite of the uniform success up to the present time, but it is so harmless, so easy to employ, and the results obtained are so encouraging that we believe it is worthy of trial and, at least, of interesting even the most skeptical.

The figures which illustrate this article are taken from among the most characteristic of the thirty-eight cases observed and cured.

LOCAL ANESTHESIA: ITS TECHNIC IN SURGICAL INTERVENTIONS ON THE FRONTAL AND MAXILLARY SINUSES.*

BY GEORGES CANUYT, BORDEAUX, AND J. ROZIER, PAU.

General anesthesia always presents dangers, both immediate and consequent to the intervention or to the patient, whatever anesthetic may be used.

Whenever there is narcosis, there is danger. The immediate dangers are asphyxia, syncope and, above all, death. The mortality due to general anesthesia is slight, but it exists beyond question much more frequently than is reported.

The secondary results are manifested in the liver, the kidneys, the lungs and the general condition, and may go as far as death. The surgeon then brings in the diagnosis of shock under operation, but rarely assigns the real cause: the general anesthetic.

Regional and local anesthesia are the two kinds used constantly in otorhinolaryngology.

The purpose of regional anesthesia is to reach the nerve trunks whose branches give the sensation to the site of operation. It is applied at some distance from the field of operation. In bringing the anesthetic agent into contact with these nerve trunks, their connection is suspended and there is temporarily a real disconnection, from a physiologic point of view, which renders the field of intervention insensible.¹

Local anesthesia is too well known for us to insist upon a description. The name of Reclus² will continue to be connected with it permanently, for he was truly its father. Local

*Translation made in the office of the Surgeon-General of the Army from the original which was published in *La Restauration Maxillo-faciale*.

1. Pauchet & Sourdat.

2. See Piquand, *L'anesthésie locale par infiltration (méthode de Reclus)*.

anesthesia by infiltration, the method of Reclus, has rendered a tremendous service not only in our special field but also to general surgery.

In this article we set forth in detail the technic of anesthesia for operations upon the frontal and maxillary sinuses. It will be evident that we consider regional and local anesthesia together, for if regional appears sufficient theoretically it is still practically preferable to use local anesthesia in addition for constancy of result.

We take the liberty of making two suggestions:

1. There is a need of practice; successful anesthetics can be obtained only after many of them have been performed. It is a curious thing to find that many surgeons who understand very well that a long apprenticeship is necessary in order to administer chloroform properly are anxious to see their first attempt with a local anesthetic successful.

2. There is a need of patience; in fact, when the local anesthetic has been administered it is always necessary to wait at least a quarter of an hour before operating.

In order to manage to reach with precision the nerve filaments which it is desired to anesthetize, it is necessary to have a thorough knowledge of the anatomy of the region. So before beginning the technical study of local anesthesia for the frontal or maxillary sinuses we have thought it useful to run over summarily the tract and the point of emergence of the nerves which control the sensations of the face.

These nerves all belong to the trigeminus, or the fifth pair of cranial nerves.¹

ANATOMY.

Trigeminal Nerve.—The three large terminal branches of the trigeminus leave the ganglion of Gasser (Figure 2), lying over the inner part of the anterior surface of the petrous. They are, from within outward:

- I. The ophthalmic nerve, which enters into the orbit through the sphenoid fissure;

- II. The superior maxillary nerve, which leaves the cranium through the large foramen rotundum;

1. Testut, *Traité d'anatomie humaine (système nerveux)*.

III. The inferior maxillary, which goes through the foramen ovale.

The first two nerves are the only ones which we are studying, for they are the ones to be anesthetized for operations upon the frontal or maxillary sinuses.

I. Ophthalmic Nerve (Figure 2).—At the point where it enters the orbit the ophthalmic nerve is divided into three terminal branches: the nasal, frontal and lacrimal.

A. The Nasal Nerve.—The nasal nerve follows the inner wall of the orbit, proceeding towards the inner anterior orbital foramen, at the level of which it is divided into two branches, the external nasal and the internal nasal or anterior ethmoidal.

1. The external nasal nerve extends along the inferior border of the superior oblique muscle, and five or six millimeters posterior to the border of the orbit it divides into three branches:

(a) Superior branch running towards the inner part of the upper eyelid and the space between the eyebrows;

(b) Inferior branch, which supplies the lacrimal sac, lacrimal ducts and inner part of the lower eyelid;

(c) Median branch which, proceeding horizontally forward, leaves the orbit and branches out in the skin of the upper part of the dorsum of the nose, then its root extends to the lower border of the nasal bones proper.

2. The internal nasal nerve passes through the inner anterior orbital foramen, over the cribriform plate of the ethmoid, through the ethmoid foramen and enters the nasal fossa, dividing into two branches:

(a) The internal supplies the mucous membrane of the septum (anterior half);

(b) The external, which is to supply the anterior portion of the mucous membrane of the turbinates and the meatus, passes to the outer wall of the nasal fossæ and then under the skin of the alæ of the nose.

B. Frontal Nerve.—The frontal nerve enters into the orbit through the external portion of the sphenoid fissure and runs along the superior wall. Behind the posterior border of the orbit it separates into the external and internal frontal nerves (Figure 1).

1. The external frontal nerve leaves the orbit through the supraorbital foramen or groove and divides into:

(a) Frontal (Figure 3) or ascending branches distributed to the skin of the frontal region;



Fig. 1. Schematic.

Emergence of the terminal branches of the Arigemimus.

1. Supraorbital or external frontal nerve. 2. Internal frontal nerve. 3. Infraorbital nerve. 4. Mental nerve.

(b) Palpebral (Figure 3) or descending branches to the skin and mucous membrane of the upper eyelid;

(c) An osseous branch which leads directly into the thickness of the frontal bone and is distributed in part to the diploe

and the pericranium and in part to the mucous membrane of the frontal sinuses.

2. The internal frontal nerve (Figure 1) leaves the orbit between the external border of the frontal and the superior oblique. At the level of the orbital border it gives off frontal filaments (Figure 3) (periosteum and skin of the forehead), palpebral filaments (Figure 3) (skin and mucous membrane of the inner part of the upper eyelid), and nasal filaments (Figure 3) (skin of the region between the eyebrow).

C. Lacrimal Nerve.—This nerve follows the external wall of the orbit and supplies sensation to the skin and the mucosa of the outer part of the upper eyelid.

Summary.—The ophthalmic nerve supplies sensation to the anterior two-thirds of the occipitofrontal region, the superciliary region, the internal two-thirds of the upper eyelid, the inner part of the lower eyelid, and finally the inner part of the ala of the nose.

II. Superior Maxillary Nerve (Figure 2).—This nerve leaves the cranium through the large foramen rotundum, penetrates the posterior portion of the pterygomaxillary fossa, which it crosses obliquely, and then enters into the infraorbital canal. It passes through the infraorbital foramen and spreads out into numerous terminal branches, the infraorbital nerves (Figures 1 and 3), which are distributed to the skin, and the mucous membrane of the cheek, nose and upper lip.

In the pterygomaxillary fossa (Figure 2) the nerve occupies the most elevated part of the region.

In the infraorbital groove the superior maxillary is separated from the soft parts of the orbit by a simple fibrous layer.

In the infraorbital canal (Figure 2) it follows the bony wall of this channel over its whole course.

From its entrance into the infraorbital groove to the infraorbital foramen the superior maxillary nerve follows the roof of the maxillary sinus (Figure 2), from which it is separated by only a thin bony plate. This last even may be lacking in places, in which case the nerve is separated from the sinus by only the mucous membrane.

From the ganglion of Gasser, where it starts, to the infraorbital foramen the superior maxillary nerve gives off five branches (Figure 2):

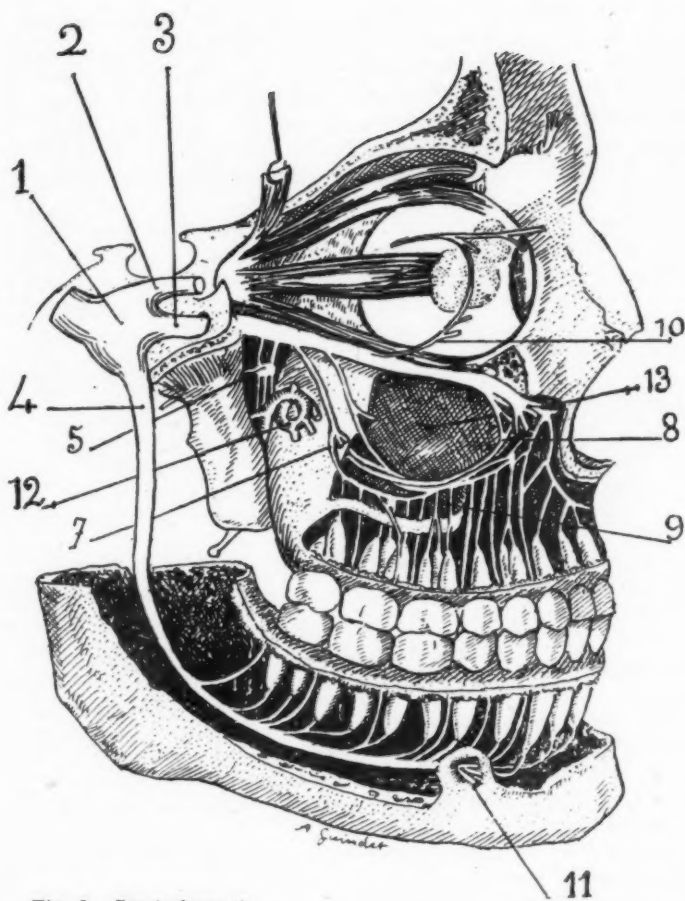


Fig. 2. Semischematic.

Superior maxillary nerve and inferior maxillary nerve; their distribution and branches.

1. Gasserian ganglion. 2. Ophthalmic nerve. 3. Superior maxillary nerve. 4. Inferior maxillary nerve. 5. Sphenopalatine ganglion and anterior middle and posterior palatine nerve. 6. Posterior dental nerves. 7. Anterior dental nerves. 8. Dental plexus. 9. Orbital branches. 10. Mental nerve. 11. Internal maxillary artery. 12. Maxillary sinus.

A. The middle meningeal branch which, having its origin in the cranium, is distributed to the dura mater.

B. The orbital branch (Figures 1 and 10), which penetrates into the orbit through the sphenomaxillary fissure, runs along its external wall and there divides into two branches: a superior or lacrimopalpebral branch (lacrimal gland and upper eyelid) and an inferior or temporomalar branch (skin of the temple).

C. The sphenopalatine nerves, two or three in number, are sent off within the pterygomaxillary fossa, and after a short course join the sphenoplatin ganglion.

D. The posterior and superior dental nerves, two or three in number, branch off from the superior maxillary just as it enters the infraorbital groove. They descend to the tuberosity of the maxilla, give off several twigs to the buccal mucous membrane and to the gums, and enter the bony canal in proximity to the molar teeth. There they form plexuses from which are distributed:

1. Dental filaments (roots of the large and small molars);
2. Alveolar filaments (periosteum of the sockets of the teeth);
- (3) Mucous filaments (mucous membrane of the maxillary sinus);
4. Osseous filaments, which are lost in the maxilla itself.

E. Anterior dental nerve (Figures 2 and 8) starts eight or ten millimeters posterior to the infraorbital foramen, and proceeds towards the incisors. It sends out recurrent filaments which anastomose with the dental plexus noted above and is finally lost in the following:

1. Nasal filaments (mucous membrane of the nasal canal);
2. Dental filaments (roots of the two incisors and the corresponding canine);
3. Alveolar filaments (alveolar periosteum and mucous membrane of the gums);
4. Osseous filaments (superior maxillary).

F. Infraorbital Branches (Figures 1 and 3).—The terminal branches of the superior maxillary nerve are divided into three groups:

1. Ascending or palpebral filaments (skin and mucous membrane of the lower eyelid);

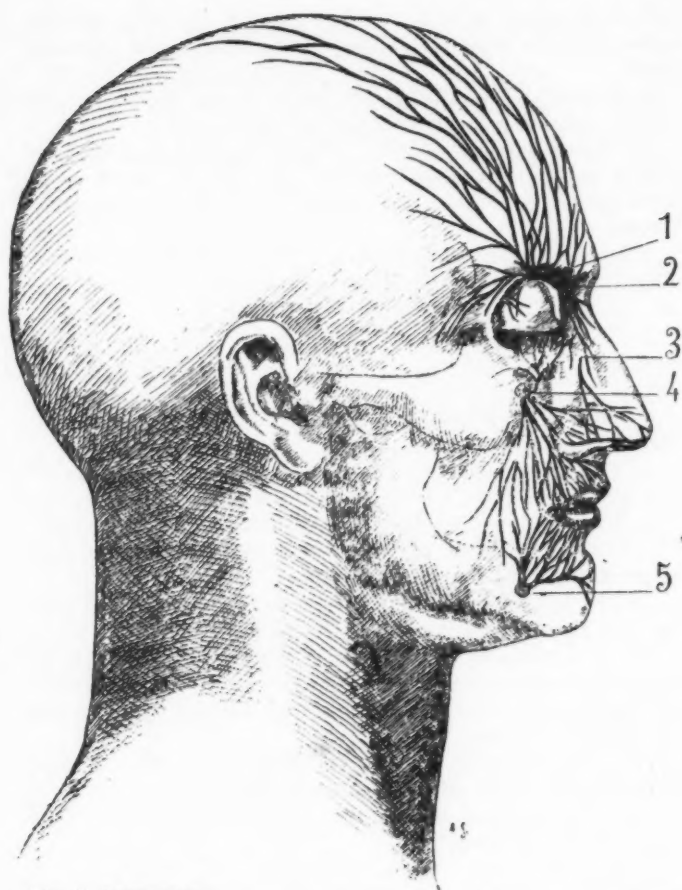


Fig. 3. Schematic.

Terminal and superficial branches of the ophthalmic superior maxillary and inferior maxillary nerves.

1. External frontal or supraorbital nerve, with its filaments spread out to the skin of the cranium and upper eyelid. 2. Internal frontal nerve with frontal palpebral and nasal branches. 3. External nasal nerve. 4. Infraorbital nerve. 5. Mental nerve.

2. Descending or labial filaments (upper lip, skin and hair bulbs and the underlying mucous membrane and glandular bed);

3. Internal or nasal filaments (skin of the ala of the nose and of the vestibule of the nasal fossæ).

G. Sphenopalatine ganglion (Figures 2 and 5, Figures 5 and 1), or ganglion of Meckel.—This ganglion is located in the pterygomaxillary fossa and joined to the superior maxillary nerve.

It sends out nerve fibers which carry sensation to the nasal fossæ, the palate and the upper part of the pharynx. These are:

1. The pharyngeal or pterygopalatine nerve, which gives sensation to the upper part of the pharynx and the eustachian tube;

2. The superior nasal nerves descend into the nasal fossæ through the sphenopalatine foramen and are divided into:

a. External branches to the superior meatus and the superior and middle turbinate, the roof and lateral wall of the pharynx;

b. Internal branches (mucous membrane of the septum);

c. Orbital branches (external wall of the orbit, posterior ethmoid cells and the sphenoid sinus).

3. The palatine nerves (Figures 5 and 6) are three in number and descend into the posterior palatine canal:

(a) The anterior palatine nerve (Figure 5) supplies the mucous membrane of the roof of the mouth, the soft palate, the middle and inferior meatuses, the inferior turbinate and the maxillary sinus;

(b) The middle palatine nerve (Figure 5) (mucous membrane of the tonsils and the pillars of the palate);

(c) The posterior palatine nerve (Figure 5) (the two surfaces of the soft palate).

TECHNIC OF LOCAL ANESTHESIA FOR THE FRONTAL SINUS.

General Remarks.—Local anesthesia is preferable to general anesthesia in the radical cure of frontal sinusitis. In fact, if the technic to be described is followed with precision, the anesthesia is perfect, and to us it seems quite useless to submit a patient to operation under chloroform with the incon-

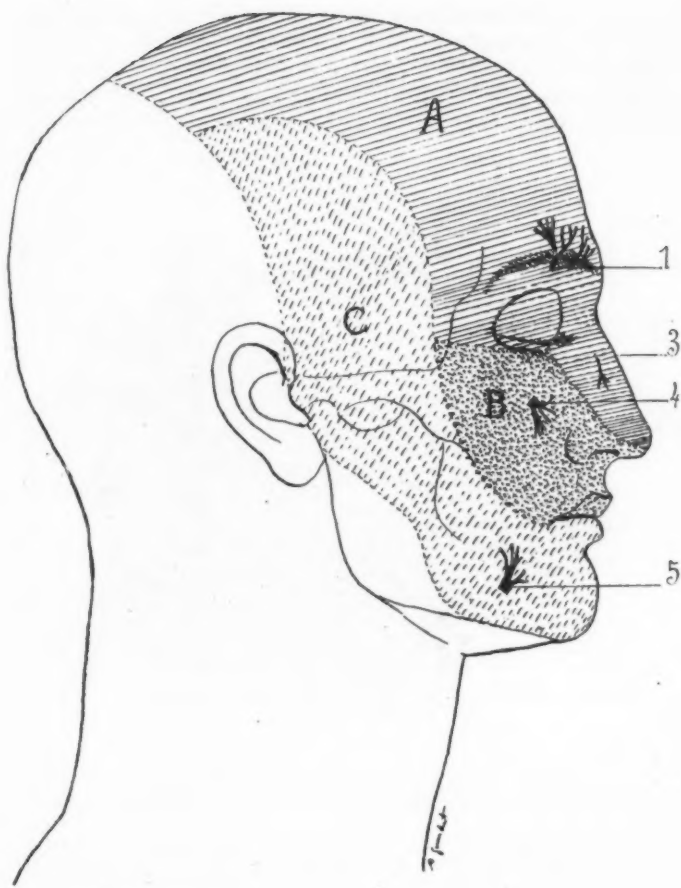


Fig. 4. Schematic.

Trigeminus nerve. Sensative zones dependent upon this nerve.

A. Sensative territory of the ophthalmic nerve. B. of the superior maxillary nerve. C. Of the inferior maxillary nerve.

1. Supraorbital or external frontal nerve. 3. External nasal nerve. 4. Infraorbital nerve. 5. Mental nerve.

veniences which accompany this method of anesthesia during and after operation.

However, it should be added that while we prefer local anesthesia for the radical cure of frontal sinusitis, we do not absolutely condemn general anesthesia, as we do in the radical

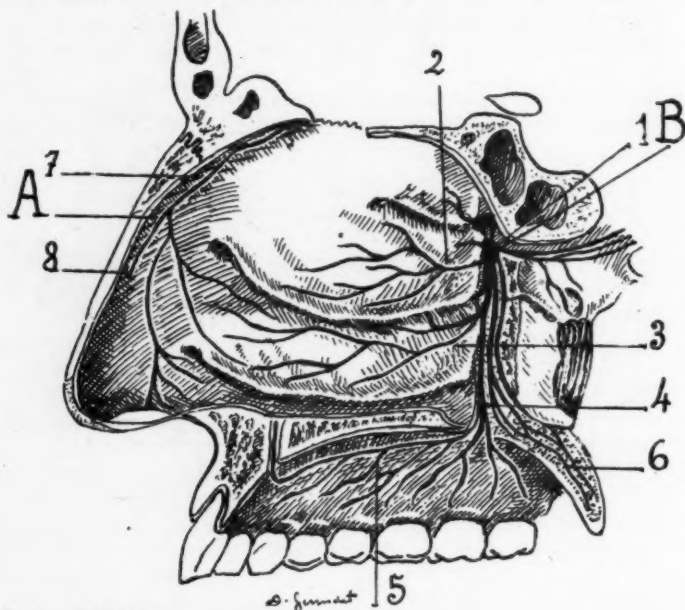


Fig. 5. Schematic.

Innervation of the external wall of the nasal fossae.

A. Territory of the ophthalmic nerve. B. Territory of the superior maxillary nerve.

1. Sphenopalatine ganglion. 2. External sphenopalatine nerve. 3. Posterior nasal nerve. 4. Anterior palatine nerve. 5. Anastomosis of the anterior palatine nerve with the external sphenopalatine. 6. Terminal branch of the middle palatine nerve. 7. External branch of the internal nasal. 8. Nasolobar nerve.

cure of maxillary sinusitis. This is an important point which we think should be noted.

On the other hand, the technic which we are about to describe is only applicable, of course, if the Ogston-Luc method

as modified by Moure is employed, namely, free opening of the frontal sinus near the root of the eyebrow (cutaneous incision along the eyebrow), careful and complete curettage of the sinus cavity, including all diverticula, if any exist, enlargement with the curette and clearing out of the infundibu-

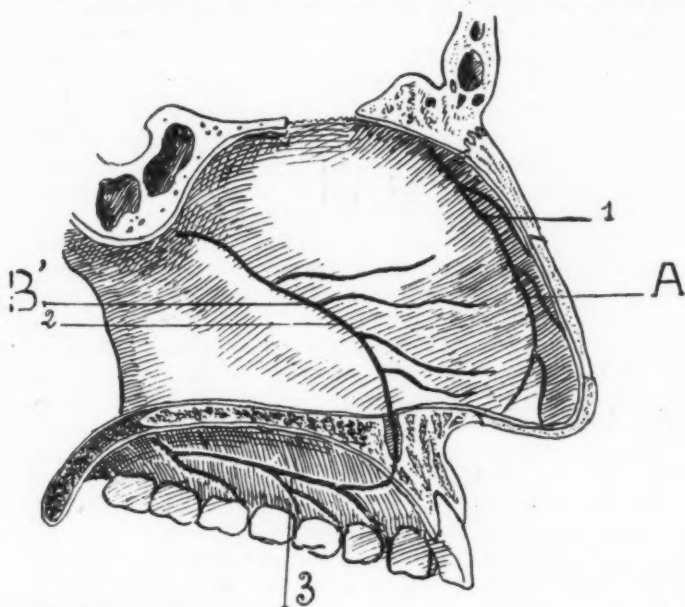


Fig. 6. Schematic.

Innervation of the internal wall of the nasal fossæ.

A¹. Territory of the ophthalmic nerve. B¹. Territory of the superior maxillary nerve.

1. Branches of the internal nasal. 2. Internal sphenopalatine nerve. 3. Anastomosis of the internal sphenopalatine with the anterior palatine nerve.

lum in the anterior ethmoid region, with free communication of the sinus and the corresponding nasal fossa, and immediate complete suture of the skin.

This operation, in Professor Moure's service, has always given good results.

As for the various mutilating and useless external methods, they have been replaced, and we will not speak of them again.

Instrumentation: A syringe (model left to choice of operator); a fine strong needle.

Anesthesia of one frontal sinus: Twenty cubic centimeters of novocain solution 1/200, to which is added six drops of adrenalin solution, 1/1,000. A solution of cocain hydrochlorate 1/10, for anesthesia of the nasal fossa and ethmoid.

Anesthesia of both frontal sinuses: Forty cubic centimeters of novocain solution 1/200, cocain solution 1/10, for anesthesia of the nasal fossæ and ethmoids.

Technic.—The ophthalmic nerve cannot be reached by local anesthesia. It is necessary to direct the needle as far as the sphenoidal fissure, which is a dangerous proceeding, because of the proximity of the motor nerves of the eye. We must be content therefore to irrigate its terminal branches.

The most important nerve to attack is the supraorbital or external frontal, which emerges from the orbit at the supra-orbital notch of the orbital arch at the junction of its inner and middle thirds.

To get perfect anesthesia the nerve should be attacked in the orbit, in contact even with the roof, before the branches emerge, and where it approaches the internal frontal nerve which supplies the internal portion of the upper lid.

The soft parts are first infiltrated, then the periosteum, and where the external frontal nerve emerges.

For this purpose, as indicated in the accompanying figures, it suffices to circumscribe the operative field with a series of punctures (Figures 7 and 8); it will be noted that not only is the region of the frontal sinus to be operated on anesthetized, but also at least the inner half of the opposite frontal sinus. In fact, it is frequently found that the sinus and nasal septum, instead of being in the median line, are situated two, three or four centimeters away from it, at the expense sometimes of the right and sometimes of the left sinus. Moreover, the two sinuses may communicate with each other, and in the course of operation it may be necessary to go beyond the strict theoretical limits of the operated sinus. For these reasons then the anesthesia must always be extensive, comprising much territory on the opposed side. We have often found this foresight valuable.

The nasal fossa and ethmoid are anesthetized by tampons.



Fig. 7. Anesthesia of the frontal sinus.

The figures 1 to 8 indicate the exact points where the needle should be introduced in order to effect anesthesia of the frontal sinus.

The zone of anesthesia is shown in the figure; however, it should be understood that the anesthesia passes by the diffusion of the liquid beyond the zone indicated.

It is quite effective, especially if one leaves in place a wad of cotton saturated with cocain during the entire operation, thus maintaining the anesthesia up to the moment of establishing nasosinus communication.

Advantages.—These are all the known and classic advantages of local anesthesia, namely, hemostasis, considerable lessening of the gravity of operation, harmless postoperative results, etc.

Inconveniences.—These are negligible. The principal one is that the anesthesia must be successful and that it can only be attained after a long apprenticeship.

Indications.—Local anesthesia of the frontal sinus and corresponding nasal fossa is indicated for:

1. The radical cure of unilateral and bilateral frontal sinusitis. This is the most frequent condition and should be absolutely well in hand.

2. Radical cure of traumatic frontal sinusitis, particularly that seen in war.

We must say, however, that in traumatic sinusitis the anesthesia is not as good as in ordinary sinusitis; in fact, the contused, damaged and scarred tissues are less responsive to anesthesia. One should carefully increase the dose a little and use 25 or 30 cubic centimeters of novocain solution for each sinus to be operated upon.

3. Foreign bodies and war projectiles in the sinuses. This is the least important indication, but gives excellent results on condition that the projectile has been carefully localized before operation. We urge that operating for projectile be done under intermittent fluoroscopy, if an unsuccessful operation is to be avoided.

TECHNIC OF LOCAL ANESTHESIA OF THE MAXILLARY SINUS.

General Remarks.—For the radical cure of maxillary sinusitis local anesthesia is the method which should be employed.

The technic about to be described is applicable to the radical cure of maxillary sinusitis according to the Caldwell-Luc operation:

1. Free opening of the canine fossa.
2. Complete curettage of the antrum.
3. Free communication between the sinus and nasal fossa.

It is the only method employed at Bordeaux by Professor Moure and has always given perfect satisfaction.

We absolutely condemn general anesthesia (Moure), be-

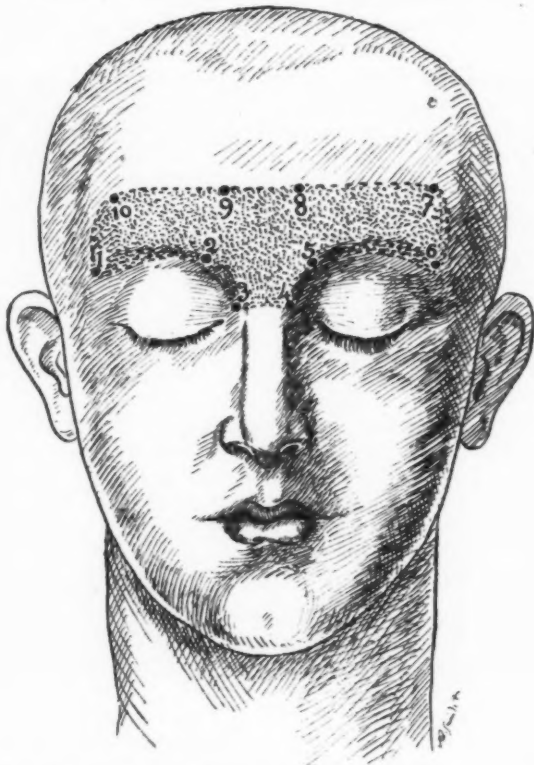


Fig. 8. Local anesthesia of both frontal sinuses.

The figures 1 to 10 show the exact points where the injections should be made to obtain anesthesia of both frontal sinuses.

The anesthesia obtained passes beyond the zone indicated.

cause, beside the dangers inherent to all narcosis, it is still more dangerous in operations on the maxillary sinus, and more particularly if the operation is bilateral.

The blood from hemorrhage which is abundant may go into the air passages and may necessitate tracheotomy. Moreover, it obscures the prognosis by reason of subsequent bronchopulmonary complications.

Instrumentation: A syringe (model according to the choice of operator) and a fine strong needle.

Anesthesia of one maxillary sinus: Twenty cubic centimeters of novocain, solution 1/200, to which is added six drops of adrenalin, solution 1/1,000. A 10 per cent solution of cocain hydrochlorate for anesthesia of the nasal fossa.

Anesthesia of both maxillary sinuses: Forty cubic centimeters of novocain solution.

ANESTHESIA OF ONE MAXILLARY SINUS.

Technic. 1. Anesthesia of the Canine Fossa.—Inject two cubic centimeters along the line of mucous incision, from the canine to the first molar, inclusive. Inject four cubic centimeters subperiosteally in the canine fossa and throughout its extent.

2. Anesthesia of the infraorbital nerve (Figures 12 and 2). The surgeon should look for the infraorbital nerve externally. To do this he inserts the needle through the skin of the cheek at a point which corresponds to a perpendicular passing through the middle of the inferior border of the orbit and at least two centimeters below it. The needle is pushed to the bone, then, tattoo fashion, directing it toward the internal border and two centimeters below it. This causes the patient to have slight sharp pains, which indicate to the operator that he is on the right path. Finally, the needle suddenly penetrates the infraorbital foramen, touches the nerve and produces an exquisite flash of pain referred to the teeth. This is absolute proof that the object has been attained.

With the needle it is necessary to penetrate well into the foramen if one desires to obtund all the terminal branches spreading out from this region, and especially the last collateral branch, the anterior dental, which comes off a little behind the terminal thickening in the osseous canal. Four cubic centimeters are injected in the locality of this nerve, by which it will be completely obtunded. The infraorbital nerve can also be reached by inserting the needle under the mucosa

of the canine fossa and pushing it up toward the emergence of the nerve. It will not be best to use this method until the operator has become accustomed to looking for the nerve and is familiar with his task.

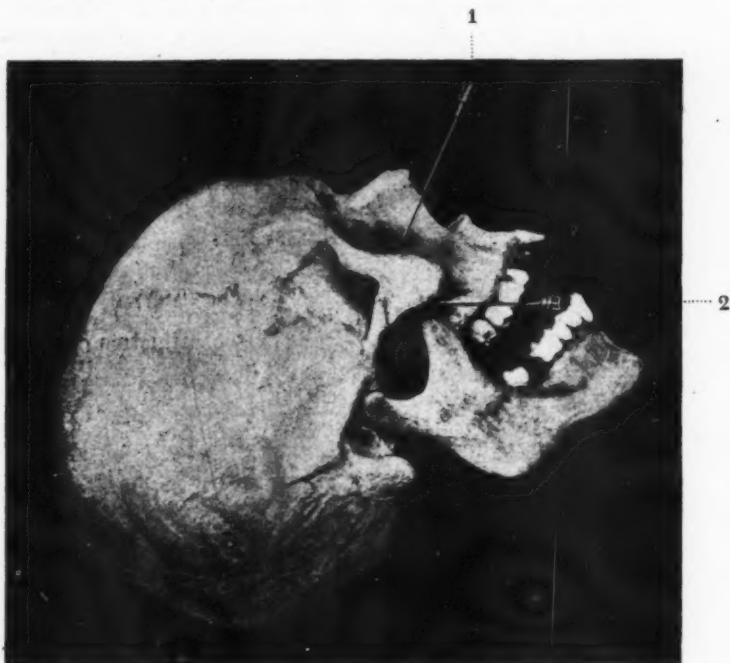


Fig. 9. Anesthesia of the superior maxillary nerve by the orbital and by the zygomatic routes.

This figure shows the position of the needles when they are in contact with the trunk of the superior maxillary nerve.

Needle 1 is passed by the orbital route.

Needle 2 is passed by the zygomatic route.

To reach the nerve it is necessary to thrust the needle under the zygomatic arch perpendicular to the external surface of the superior maxillary. Then by directing it upward and backward, it penetrates into the pterygomaxillary fossa where the nerve is found.

Needle 2 shows the last step.

3. Anesthesia of the Superior Maxillary Trunk.—This is the most important injection—in fact, theoretically anesthesia of the trunk of the superior maxillary nerve should be sufficient.

Practically this injection alone does not cause absolute anesthesia, but if it is well and successfully done, combined with anesthesia of the canine fossa and infraorbital, the anesthesia is excellent. We constantly obtain perfect anesthesia, in every patient, in the radical cure of maxillary sinusitis.

Two ways are at the choice of the surgeon in reaching the superior maxillary nerve at the large foramen rotundum: the zygomatic and the orbital route.

1. Zygomatic Route (Figures 9, 11 and 12).—Taking the zygomatic arch as a landmark, the needle is inserted through the skin under the lower border of the arch a finger's breadth in front of the ascending ramus of the lower jaw, and is pushed to the bone which is the external surface of the superior maxilla. The needle should be glided deeply the entire length of the latter, directing it upward and backward; thus the pterygomaxillary fossa is penetrated at the superior maxillary nerve. As soon as the nerve is reached by the needle point the patient feels a violent flash of pain comparable to a discharge of electricity, referred to the teeth. The maneuver is then successful, and four or five cubic centimeters of the solution are injected.

In this way the nerve is reached in the posterior wall of the pterygomaxillary fossa, near the foramen rotundum, and the sphenopalatine ganglion at the same time. Wounding of the internal maxillary artery is possible, theoretically; practically, it is very rare, and even if it happens there is no danger.

The above is an easy, certain method, free from danger, and has given us such good results that we now employ it almost to the exclusion of every other.

II. The Orbital Route (Figures 9, 10, 11, 12).—By this route (Chevrier) the superior maxillary nerve is reached at the sphenomaxillary opening. This opening, situated at the upper limit of the posterior wall of the pterygomaxillary fossa, has the large foramen rotundum at its posteroinferior extremity. Under the fibrous membrane which covers the opening in the living, completely separating the orbit from the

posterior wall of the pterygomaxillary fossa, the superior maxillary nerve gives off the most of its collateral branches—the palatine nerve, the posterior dental branches and the orbitolacrimal—before entering the inferior orbital groove.

Having taken as a landmark the inferior border of the

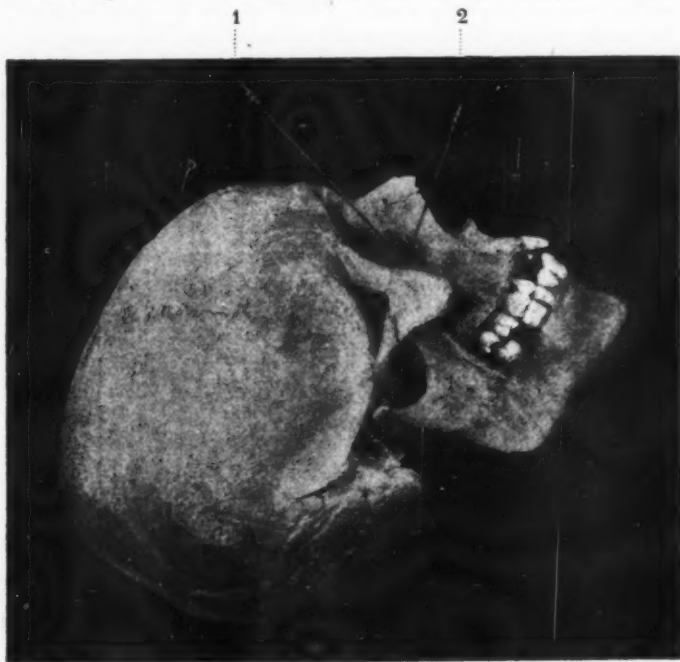


Fig. 10. Anesthesia of the trunk of the superior maxillary nerve by the orbital route.

We have thought it useful for the purpose of clearness to photograph this plan with the skull.

1st Step. The needle (1) is thrust perpendicular to the floor of the orbit.

2nd Step. The needle is glided along the floor of the orbit and lowered slowly until it becomes oblique (needle 2).

When the needle leaves the bony floor, it will enter the orbital fissure, if it is thrust deeply backward.

The maneuver is complete when the patient complains of lightning pains in the teeth.

orbit, at a finger's breadth from the external border, the needle is entered perpendicularly to the floor of the orbit (Figure 10). This done, it is necessary to glide it along the floor, lowering the needle progressively until the bony resistance ceases. Then the orbital fissure is penetrated. It remains only to force the needle, which was at first perpendicular to the orbital floor but is now oblique, into the vicinity of the superior maxillary nerve. The maneuver has succeeded when the patient feels a sharp flash of pain radiating to the teeth. Five cubic centimeters of solution are injected while progressively withdrawing the syringe.

The orbital route is more difficult than the other; it demands large experience and considerably impresses the patient, who fears for his eye. We have employed it for several years without trouble or accident (Canuyt).

Theoretically grave accidents are to be feared—false paths causing a lesion of the eyeball, phlegmon of the orbit, paralysis of the oculomotor nerves, etc. Practically there are none; the sole complication noted were the hematoma, the cause and mildness of which are easy to understand. Either the zygomatic route or the orbital route gives complete anesthesia of the jaw, upper lip, all the teeth, nasal fossa, lower eyelid and the sinus cavity of the side injected.

4. Anesthesia of the Corresponding Nasal Fossa.—The nasal fossa is carefully tamponed with 10 per cent cocain solution, and especially the inferior turbinate. If a few cubic centimeters of novocain solution remain, we inject it over the nasosinus wall in the inferior meatus, in order to have a perfect anesthesia at the time of penetration. Finally, we put a gauze tampon impregnated with 10 per cent cocain solution in the nasal fossa to remain during the whole operation.

Thus performed, anesthesia of the maxillary sinus is

1. Logical. The superior maxillary nerve is obtunded at its trunk. The nerve branches are obtunded by infiltration;

2. Rapid. Three punctures are made, and an ordinary anesthesia of the nasal fossa;

3. Methodical. It comprises four steps: Anesthesia (1) of the canine fossa, (2) infraorbital nerve, (3) superior maxillary nerve, and (4) nasal fossa.

This technic gives constant results.

ANESTHESIA OF BOTH MAXILLARY SINUSES.

It is necessary, first, completely to anesthetize one sinus, then the other, but not overlap them. Twenty cubic centimeters are injected for each sinus, a total of forty cubic centimeters.



Fig. 11. Radiograph of a patient showing the method of anesthesia of the superior maxillary nerve.

Orbital route, needle 1. Zygomatic route, needle 2. This radiograph establishes that the two needles meet at the same point. We have thought it interesting to show in this way that the superior maxillary nerve can be reached in each of these methods: the orbital and zygomatic.

meters, Operation should be commenced on the sinus first anesthetized. It must be remembered that the radical cure of a double sinusitis is an extensive operation, rather long and

trying, and a hypodermic of morphin should be given when beginning the anesthesia.

ANESTHESIA FOR PARADENTAL CYSTS.

For paradental cysts the anesthesia should be made according to the following principles:

In the first place, it is very hard to know before operation whether the cyst is intra- or extrasinus. Errors on this point are frequent, and a cyst supposedly having no relation to the sinus cavity may be situated within it. Therefore we advise, save in exceptional circumstances, always to make a complete anesthesia of the maxillary sinus like that described for the radical cure of maxillary sinusitis.

Anesthesia of the canine fossa should be thorough, injecting about eight cubic centimeters, especially at the internal portion of the ala nasi and the ascending branch of the superior maxillary.

It is known that a paradental cyst, if it arises from an upper incisor or canine, pushes out of the upper lip and even into the nasal fossa. Therefore the anesthesia should be liberal in this region. Similarly, if the cyst arises from the first or second bicuspid or the first two molars, it will direct itself toward the sinus cavity. The tumor enlarges, pushing bone and periosteum before it, and goes toward the point of least resistance, which is the maxillary sinus; if the latter is intact, the cyst is extra-sinus; but if it is perforated we have an intra-sinus cyst, either membranous or bony, according to the case. Hence, from the viewpoint of local anesthesia, we must be ready for any eventuality and must have a complete anesthesia permitting completion of the operation, whatever surprises may occur.

To sum up, the technic of anesthesia is that for maxillary sinusitis with extensive infiltration of the canine fossa and internal aspect of the corresponding nasal fossa:

Advantages.—We shall repeat what we said of frontal sinus anesthesia—that they are those of local anesthesia in general, which need not be emphasized. With general anesthesia the radical cure of maxillary sinusitis is a grave, difficult and even dangerous operation.

Conclusion.—Never general anesthesia:

Indications.—(1) Radical cure of maxillary sinusitis, unilateral or bilateral.

(2) Radical cure of traumatic maxillary sinusitis, unilateral or bilateral.

(3) Paradental cysts, whether intrasinus or not.



Fig. 12. Anesthesia of the maxillary sinus.

This figure shows a patient on the operating table prepared for an operation on the left maxillary sinus. The anesthetized region has been circumscribed by a sterilized operative field after an application of tincture of iodine.

Needle 1 has been passed by the orbital route and is in contact with the superior maxillary nerve.

Needle 2 is in contact with the infraorbital nerve.

Needle 3 has been passed by the zygomatic route and is in contact with the superior maxillary nerve.

(4) Foreign bodies and projectiles in the sinus.

It is absolutely necessary that the projectile be perfectly localized by a radiologist before operation. Moreover, if the localization is uncertain it is indispensable to operate under the fluoroscopic screen, a sure method, which saves the surgeon from a fruitless operation.

SALIVARY FISTULÆ.*

By L. DIEULAFÉ.

In the surgery of civil life the clinical history of salivary fistulæ is altogether limited to that of the parotid gland and of Stenon's duct; the submaxillary gland by reason of its situation in the floor of the buccal cavity escapes traumatism, and in the case of fistulæ consequent upon inflammations of the submaxillary gland or calculi in Wharton's duct, the opening is made inside of the buccal cavity and offers no functional inconvenience.

In war surgery, with all the complex lesions of the maxillary glands and the floor of the buccal cavity and the extensive condition involving the bones and the soft parts, I have never seen a fistula of the submaxillary gland which indicated a special operation. Indeed, according to my previous studies and my observations in war surgery, I need describe only two varieties of salivary fistulæ:

- (a) Parenchymatous fistula of the parotid gland;
- (b) Fistula of Stenon's duct.

The masseteric region and the retromaxillary space, increased by the extension movements of the head, afford the parotid gland such a large surface in which to spread itself that there should be no surprise at the frequency of traumatic lesions of this gland; in addition to this, accidental traumatisms, surgical incisions, foreign bodies within the small ducts, calculi or abscesses may be the cause of fistulous lesions. In war surgery it may be implicated by wounds from various projectiles (bullets, fragments of shells); these fragments of shells of different caliber, sometimes more than one on the same gland, frequently cause lesions of the parenchyma of the gland.

A clean cut section of the parenchyma, especially if it remain aseptic, is restored spontaneously; but the contusion conse-

*Translation made in the office of the Surgeon-General of the Army from the original which was published in *La Restauration Maxillo-faciale*.

quent upon wounds by projectiles or suppuration breaks open the multiple lobules, attacks the intraglandular canals of appreciable caliber and the saliva pours out through a wound in the skin. In our men wounded in war attention to this flow is sometimes neglected at the beginning, because the phenomena of inflammation which result in the production of pus call for the use of dressings, under the protection of which the pathologic feature of the saliva discharge passes unnoticed. It is the same in cases of intraglandular collections; Daniel Mollière has shown that in these cases the fistulæ are preceded by a salivary tumor of slow development, with its volume varying from day to day, the skin covering of which becomes attenuated and reddened and ends in spontaneous ulceration, unless the surgeon may have been induced to make an opening.

When a parotid fistula becomes established after the retrogression of inflammatory phenomena or after the healing of the entry wounds made by projectiles or by operative wounds made to remove them, there may be noticed on the masseteric surface or in the sternomaxillary region a small reddish spot, depressed or acuminate, from the center of which a discharge of a clear viscid liquid appears, its flow limited to a few drops when the jaws are in a state of repose, but greatly increased during the movements of mastication. This is the real secretion mechanism of the parotid saliva.

It is only in cases where the fistula formation is of little importance or possibly where the suppuration of the parotid wounds is still more marked that there need be hesitation as to the diagnosis. In these cases, if the observation of the product of the secretion is not sufficient, the function of the gland may be stimulated by touching the lingual mucous membrane with a little vinegar or possibly by having the patient masticate. I have him chew a piece of hard bread for a moment. The characteristic limpid fluid is then seen flowing abundantly in real rushes through the fistulous place.

Sooner or later the diagnosis is always established; it may even thrust itself upon our notice, for when the other pathologic phenomena have all ceased this abnormal flow alone will remain. In this condition the patient himself makes the diagnosis, for the flow is produced only at the time of meals, and then he notes that his cheek is wet and even in certain cases

actually flooded by the liquid that streams even over his clothes.

In our wounded men who require attention on account of projectile wounds, it is only after the cure of the wound that the fistula offers any inconvenience; at the time when all dressings should be omitted the abnormal flow attracts attention and presents a new therapeutic indication. A few have been referred to us for salivary fistula, but in others who have been evacuated into the special services for facial or maxillofacial lesions, the salivary fistula was first discovered at our examination. Variations in the abundance of saliva flowing through the fistula depend upon the anatomic varieties of lesion; they may result from small lobules or from quite extended portions of the parenchyma with opening of important intraglandular canals.

The fistulous points may be multiple, but my own cases have been single, except in one case in which they were double. The site of the lesion necessarily varies greatly, since all of the region occupied by the parotid gland may be affected by a traumatism or may become abscessed on account of an intraglandular collection. In the latter regard, on account of the burrowing of the pus, the outlet of the pus may be external to the parotid region.

Parenchymatous fistulæ have a tendency to disappear spontaneously, and as in the surgery of civil life they hold only a small place as a clinical entity, but in war surgery the fistula may persist in view of the long periods of observation often necessary for the care required for the accompanying lesions.

I should point out that when the flow from the fistula ceases on account of spontaneous cicatrization the results are as good whether the lower jaw is allowed to be free and movable or fixed by means of an appliance for a fracture; and when the fistula persists after a long period it is found quite as frequently in patients with lockjaw or in those whose mouth has been kept closed for a long period for the fracture to grow firm as in those who have kept up the movement of mastication during the entire period.

It is not a very serious condition, but it is embarrassing, however slight the flow may be.

To what method of treatment must recourse be had?

Pressure. Excision of the Tract.—First of all, I call attention to the two procedures which have been shown to be inadequate and which consequently need not occupy our attention: Pressure, recommended by Jobert, and excision of the fistulous region, followed by suture.

Cauterization.—Cauterizations with nitrate of silver and with the thermocautery have given good results. For small fistulæ, with a slight flow, and consequently limited to small acinous groups, cauterization with delicate thermocautery points has given me good results. I make these cauterizations in two ways:

1. I cauterize the accessible parts of the parenchyma right through the tract of the fistulæ; if this procedure is to be effective two or three cauterizations at intervals of three or four days should result in the cure.

2. But these cauterizations may be inadequate and yet the lesions may be too insignificant to justify a surgical operation; the fistulous point can scarcely be noticed, for in the intervals between meals there is no flow, and it is only at the time of mastication that the clear drops rise to the surface and trickle down. In these cases I enlarge the orifice under local anesthesia and make an incision above and below the fistula (always in the direction of the fibers of the facial nerve at this place) and through this little opening I sear with the cautery all the surface laid open, curette or excise the cutaneous tract, and unite the cut surfaces with horsehair or silk.

In the slight cases my advice is always to begin with one or the other of these methods; they are recommended most particularly for small fistulæ consequent upon intraglandular suppurations.

Injectations of Oil.—Taking as his basis the atrophies of the pancreas obtained in the experiments of Claude Bernard by injecting fatty substance into its interior, Daniel Mollière undertook to cure parotid fistulæ by injecting aseptic oil into the injured lobule.

In two cases I tried injections of gomenol oil into the fistulous tract after failure with actual cautery, there was a very perceptible diminution in the secretion of the saliva through the orifice of the fistula, but this result was temporary. The secretion reappeared in a few days. These re-

sults do not justify any judgment as to the method, for it is not likely that the oil penetrated as far as the secreting acini.

Creation of an Intrabuccal Opening by Transfixion.—Fano and Duplay made an artificial passage within the mouth.

I have myself made an intrabuccal opening, in three cases where the fistula was situated over parts of the parenchyma upon the external surface of the masseter and adjacent to the anterior border of this muscle. I only followed the procedure which I used in fistulæ of Stenon's duct when this duct had a lesion in its posterior extremity, or when it was very tightly involved in hard cicatricial tissues or in tissue infiltrated with neoplastic formation.

This is the procedure that I advise:

A probe blunt at the end is inserted into the cutaneous opening, introduced through the tract without effort. The skin is cut in a lineal direction anterior and posterior to the probe. The end of the probe must not be displaced and must always mark the base of the fistula; this is the place where the collections of acini occur or where the small channels abnormally open, and this is the place which should become the center of the transfixion. Without leaving the mark the probe is directed obliquely forwards anterior to the mucous membrane in the chin portion, and pierces through the lesion in the parenchyma. With a fine bistoury, guided by the probe in order to open all of the tissues which separate the gland from the buccal cavity, we slide over the anterior border of the masseter, for if the muscle is pierced the new tract would be quickly closed by the muscular contractions. This forms a very oblique course across the gland, the genial aponeurosis, the bulb of Bichat and the mucous membrane. We press back anteriorly all the tissues that cover the masseter in order to avoid cutting the facial vessels. A drain is introduced into this tract, choosing one of from six to eight millimeters; in order to put it in place a Péan's forceps is introduced through the mouth and the opening made in the mucous membrane; the forceps are pushed to the opening in the skin, giving them free play; and the drain introduced and drawn toward the mouth. This drain is left for a considerable time in the vestibule of the mouth, and it is fastened by means of a thread which goes through it to the neck of a tooth, most often one

of the upper premolars. On the skin side the drain is cut off level with the parenchyma; the incision in the skin is sutured above after incision of the fistulous tract. The skin wound and the buccal cavity are kept very clean, irrigation through the drain, and after a few days the skin wound closes up. The drain is left in place as long as possible, ten, twelve or fifteen days, in order to obtain a well formed tract through the tissues.

After removal of the drain, it is still necessary to maintain the new opening through the vestibule of the mouth; thus an accessory excretory canal is created. In one of my operations, this canal did not remain permeable and the fistula returned.

Removal of the Auriculotemporal Nerve.—It has seemed rational to deal directly with the secretory nerves of the parotid gland. Before the war, Leriche had tried the removal of the auriculotemporal nerve in order to do away with the parotid secretion in a case of a fistula and also in a case of long standing hypersalivation in connection with a serious case of aerophagy. One of his pupils (Aigrot, Lyon chir., 1914, p. 242) was very enthusiastic about this therapeutic procedure. The experiments of Claude Bernard have, in fact, assigned to this auriculotemporal nerve the excretory part in the function of the parotid gland, and experimenters who have followed have confirmed this fact, although they have shown definitely that the secretory filaments from this nerve do not originate from the inferior maxillary nor from the facial, but from the glossopharyngeal through the intermediate nerve of Jacobson which supplies the small deep petrosal nerve at the otic ganglion. The proof is demonstrated by the following experiments: The excitation of the glossopharyngeal nerve in the cranium or of the nerve of Jacobson provokes secretion; on the contrary, intracranial section of the glossopharyngeal or of the small petrosal, or the extirpation of the otic ganglion suppresses the action of the reflex stimulants of the secretion. Similar experiments show that the inferior maxillary nerve and the facial nerve do not play any part in excretion.

The cervical sympathetic nerve also plays a part in the parotid secretion by the action of the external carotid plexus.

In spite of these scientific facts, in spite of the results ob-

tained by Leriche, I was persuaded a priori that the nerve mechanism of the parotid secretion was more complex, for within the parenchyma of the parotid gland the auriculotemporal nerve receives an anastomotic branch from the facial nerve. It seems to me that, if the auriculotemporal nerve had the preponderating rôle shown by Claude Bernard, it should not be the only one to act; it is indeed admitted that the sympathetic nerve has a rôle, and I believe that the facial must have one also.

I was quite prepared for failure to obtain an absolute drying up of the parotid secretion by the cutting of the auriculotemporal nerve alone; nevertheless the observations of Leriche were encouraging and all other means of healing were without result.

Through some investigations made upon the cadaver I ascribed a certain importance to a filament of the facial nerve which ran posterior to the condyle and was united with the auriculotemporal. There was no possibility of getting to the sympathetic plexus of the carotids without destruction of important tissue. It was therefore necessary to resort to the operation of Leriche.

It is advisable to make quite an extensive resection to avoid the deep plane of the carotid.

The technic is very simple. The operation can be made either under general or local anesthesia; local anesthesia must be reserved for cases where there is no inflammatory cicatricial tissue in the region of the nerve, and general anesthesia is preferable in the other cases.

An incision four centimeters long is made in front of the tragus, passing a little in front of the ear and down to the posterior border of the maxillary, a little below the neck of the condyle. Below the skin in front of the tragus, the temporal artery is carefully made out, its beats serving as a guide. Close behind the artery is found the vein in the conjoint sheath of the vessels, more difficult to find because it is not prominent like the artery which is pulsating. The nerve is found, separated from its surroundings, held with a pair of smooth forceps and its peripheral end divided. The nerve is always isolated by going down across the gland, and it must be disengaged very far down. In some dissections I have seen very clearly

the anastomotic branch of the facial nerve and have divided it separately. When the nerve is disengaged very far down outside of the gland, the forceps are given a twist and the nerve is coiled around them. The coiling is always done very gently while the nerve is stretched out, the parts farther down are disengaged and it is separated quite entirely by this motion of pulling out.

Looking for this nerve is made very difficult by hemorrhage. When local anesthesia is used a little adrenalin is put into the solution of stovain or cocain.

If an operation is done in a cicatricial mass, as I have done twice, it is very tedious, and the search for the nerve is difficult. It is necessary to invade the healthy tissue, find a branch of the nerve and follow it down to the trunk, and then isolate this carefully without dividing it too soon. The operation will be useless if all the gland filaments of the nerve are not resected, for the filaments returning to the gland as well as the anastomotic branch of the facial nerve would be spared.

What proves that the parotid secretion is, like the submaxillary secretion, a complex nerve phenomenon is the fact that this secretion does not stop instantly in those upon whom the operation has been performed.

I have tried the resection of the auriculotemporal nerve for fistula of the parotid gland variously situated, three times in healthy tissue, twice in cicatricial tissue. In every instance the secretion was continued after the operation and then disappeared.

In two cases it was necessary to complete the cure of the fistula by cauterizing, which had previously been without value. After the operation there still remains in the gland nerve connections which keep up the secretion and which are gradually checked by reason of the absence of stimuli from the auriculotemporal nerve.

But, on the whole, this operation led to the therapeutic success which was sought.

B.—FISTULÆ OF STENON'S DUCT.

The war has enriched the practice of surgery in the matter of fistulæ of Stenon's duct. In my volume on the surgical conditions of the buccal cavity (Vol. 8, *Traité de Stomatologie*), I

wrote: Wounds of the cheek assume quite a special character when they affect Stenon's duct, resulting, indeed, in a salivary fistula. These fistula appear as a complication of traumatic wounds, and may also originate in the course of surgical treatment, as, for instance, opening an abscess, removing a neoplasm or excising flaps for an autoplasty. They may also follow in the wake of inflammatory lesions or ulcerations due to salivary calculi. In 1911, I had one of my pupils (E. Lafont, Thèse de Toulouse) publish a comprehensive study of fistulæ of Stenon's duct, and he reported one of my cases in which the fistula was consecutive to an epithelioma of the cheek.

The present circumstances afford an opportunity for renewed study of the traumatic variety of these fistulæ. Among those that I have examined in men wounded in war, I have been able to establish various pathogenic conditions: (1) Very limited traumatism of the cheek from a fragment of a shell injuring the duct of Stenon directly and forming the fistula as the result of a lateral section of this canal; (2) extensive laceration of the tissues of the cheek by fragments of shells, followed by cicatricial contractions drawing together the duct of Stenon, obliterating its normal orifice and leaving the wound of the canal open upon the skin; (3) a traumatism, always from fragments of shells, which are of all projectiles most likely to produce serious wounds, after injuring the bones and soft parts and giving rise to inflammatory phenomena which open into and form abscesses and fistulæ in the duct of Stenon. The second class is the most frequent; of each of the others I have observed only a single case.

By reason of the frequency of facial lesions in the present war, their seriousness and the extensive destruction which they produce, I have the impression that the fistula in the duct of Stenon is a rare complication of them. These lesions are indeed followed by tough, cicatricial reparative tissue which often obliterates the wound in Stenon's duct; the cicatricial pressure, in this case, is converted into a spontaneous ligature of the canal and dries up the fistula by sclerotic transformation. There is from this fact a suppression of the excretory salivary canal, and secondarily, an arrest of the secretory function and an atrophy of the gland.

All the surgeons who have operated in the centers for

maxillofacial surgery have reported the sclerotic tendency of all cicatricial tissues, including the superficial skin lesions as well as the soft parts adjacent. I have often performed esthetic operations for cicatrices extending over a large portion of the face, which obliterated and stenosed into a sclerotic mass a wound which had injured irreparably the duct of Stenon, as it had cut off all the soft parts in this region. In the course of the dissection I did not even find a trace of this duct.

Relying on this spontaneous tendency to heal, I consider as absolute only such fistulæ as have resisted the test of time, and during the period of observation (most often depending on the treatment of other lesions) I stimulate the cicatricial process by hot cauterizations over the fistulous area as is done in fistulæ of the parenchyma.

But if the fistula is obstinate, all the symptoms of this lesion are present; most often a clear liquid is seen to exude along a fungus growth in the region of the masseter or the buccinator. This liquid is slight in quantity in the intervals between meals, but increases and becomes very abundant during mastication. An opening more or less visible leads to the passageway of Stenon's duct. The patient sometimes experiences a dryness in the mouth on the side where the fistula is located, but no trouble in nutrition results from it. Sometimes there is a kind of cystic sac at the level of the fistula which is easily emptied by pressure, causing the salivary liquid to flow out. This sac is due to the accumulation of the liquid between the wound in the duct and the opening in the skin. Its existence, in cases where intervention is necessary, is a valuable landmark in the formation of a new collecting channel.

The flow of the saliva through the abnormal channel is more abundant than in parenchymatous fistulæ, since the fistula carries by the principal collecting channel the entire amount of the parotid saliva. The quantity of saliva varies: A patient of Duphœnix discharged 70 grams in a quarter of an hour; one of Jobert lost several teacupful in twenty-four hours; Mischerlich had a fistula which discharged only 60 to 95 grams in twenty-four hours; Beaunis states that the average discharge is 80 to 100 grams per day, while Hirschfeld reports a

quarter of a liter discharged at a single meal. Besides this, the quantity depends on whether the buccal end of the canal is still discharging or is completely cut away. The discharge occurs at the time of mastication, and it is by the action of mastication that it is brought into notice. Sometimes the saliva is accompanied by purulent secretions proceeding from an area of inflammation with which the fistula is connected; at other times the flow of saliva is the only symptom. The loss of a large quantity of a liquid which results from the recrementitious secretion and which contains mineral salts, especially chlorides and phosphates, entails in the long run a weakening of the organism; besides, the abundance of the flow constitutes a real infirmity.

In order to treat the fistulæ of Stenon's duct, several procedures have been put into practice, as in the case of the parenchymatous variety:

Compression of the gland (Désault) or of the canal (Maisonneuve).

Injections producing atrophy (Daniel Mollière, Tussau, Cocchini).

The absolute immobility of the jaws (Moure, Piétri).

Cauterization of the Fistulous Tract.—Galen obtained a speedy cure by the application of a plaster; Ambrose Paré cured a soldier by means of aqua fortis and vitriol; Louis obtained a successful result by cauterizations with nitrate of silver, as also Dupuytren, Hergott, Lombard, Ravenel. There is every evidence that in order to obtain the cure of the fistula by simple cauterizations of the surface the fistula must be the result of a lateral wound of the duct, and this latter must remain permeable in its peripheral portion. It is thus that I explain a cure that I obtained upon a soldier whose wound, limited strictly to the buccinator region, led directly over the duct.

Simple Occlusion of the Fistula.—This treatment has given good results in recent fistulæ with permeability of the buccal segment of the duct. Malgaigne completely obliterated the orifice by means of thin goldleaf pasted on the skin with pitch; Rodolphi, Michalski, Champouillon, Tornley and Stokey have used collodium for this purpose.

The Suture of the Fistula.—The reuniting of the edges of the fistula after scraping them afresh may only be successful in the case of recent fistulæ with slight discharge; Morand, Sr., used it with success in one case.

The suture of the two ends of the duct (Nicoladoni, Dollinger) of its restoration by autoplasty (Bérard, Badiali), exceptional procedures which can be recommended only in cases where the divided ends of the duct are not retracted and where the surrounding tissues have remained free from sclerotic transformation.

The Reestablishment of the Permeability of the Anterior End.—This has in view dilation of the anterior segment so as to make sure of an easier flow of the saliva towards the mouth. The treatment with the seton may be mentioned (Louis, Morand) and that with the canula (Bérard).

The creation of an artificial passage towards the mouth. The following methods are used: Single puncture (Deroy), the seton (Monro, Larrey, Contavoz, Prompt, Jobert, Désault, J. L. Petit, Percy), the canula (Duphoenix, Atti, Higguet), the rubber drain (Pozzi, Kaufman, Reynier, Richelot, Décrétion, Rey), the double puncture, a method intended to avoid the continued use of a foreign body and to effect an extensive loss of substance from the mucous membrane (the method of Déguise, and also that used by Béchar, Croserio, Gosselin, Trélat, Malgaigne, Le Fort).

The creation of an artificial passageway by transfixion has seemed to me applicable in most cases both for wounds in Stenon's duct and in the masseteric lobes of the parotid gland. I had at first recommended in the thesis of Lafont (Toulouse, 1911) a procedure which made an opening in the mucous membrane opposite to the zone of the fistula, and abandoned this opening after having cauterized the whole tract with thermocautery and having sutured the skin after incision of the cutaneous fistula. Since the war the method by transfixion which I have practiced has been enforced upon me either by the receding position of the fistula, which did not permit the treatment of the posterior end of the duct or by the sclerotic condition of the chin tissues which stood in the way of the examination of the duct.

After an incision in the skin at the very level of the fistula

and excision of the fungous tract, there is a landmark to the probe at the point in Stenon's duct or in the sclerotic tissues that have replaced it and that correspond to the cloaca, everted or not, which serve as an intermediate channel between the normal duct and the tract in the skin. From this point in the mucous membrane the creation of a very extensive opening connecting with all of the tissues is made with a bistoury. Péan's forceps are introduced by the buccal passage through the incision in the mucous membrane, by means of which a free passage is made for a drain going from the fistulous cloaca to the buccal cavity. On the skin side the drain is shortened so as to leave its end buried under the skin; this is reestablished in its continuity by direct suture of the incisions surrounding the fistula; on the side of the mucous membrane the drain is fixed in place by the means of a catgut. This drain should remain in place as long as possible, from ten to fifteen days. By this procedure the passage of the flow of saliva towards the buccal cavity is reestablished; I have made use of it four times and each time with success.

Transplanting of Stenon's duct has been practiced by Langenbeck, Goris, Ribéri, Delore, Princeteau, Schartz, Bouglé, Poenaro-Caplesco. I had no success in one case in which I tried this transplanting after removing an epithelioma from the cheek (Lafont, Toulouse, Thesis, 1911), but in two men wounded in war where I was able to take off the posterior end of the duct and join it to a healthy part of the vestibular mucosa I was entirely successful. For the success of this procedure the tissues thus treated must not be the seat of cicatricial process; I recommend it for all cases where an appreciable segment of the posterior end can be found and joined to a healthy mucous membrane.

The creation of an artificial duct at the expense of the mucous membrane has been proposed by Braun and Nicoladoni. It would be applicable in cases in which the posterior end of the duct is too short to be transplanted and in which the tissues of the cheek have not been altered by inflammatory or cicatricial processes.

The transfixion method is always easier.

Suppression of the salivary secretion is a method especially applicable in cases of parenchymatous fistulæ, and I

have already explained how I obtained this result by the resection of the auriculotemporal nerve. I would hesitate to advise this for a fistula in Sténon's duct, for the fistula situated over the duct, in my opinion, should always be cured either by transplantation or by transfixion.

Certain authors have secured suppression of the parotid secretion by imitating a process which nature has brought into play in numerous individuals who were mutilated about the face. In fact, in many wounded in whom there is no salivary fistula, Stenon's duct has been the seat of a destructive wound and has consequently been enfolded in a cicatricial process which has dried up altogether. This is identical with the procedure of ligating Sténon's duct (Viborg, Gollisen, Velpeau, Borel, Pelschinsky). Quite recently Morestin, after resection of the cicatricial tissues surrounding the fistula, tried torsion and suture of the central portion, thus obtaining a cure, without noticing any phenomenon of retention or painful tension on the part of the gland.

ABSTRACTS FROM CURRENT LITERATURE.

I.—EAR.

Diseases of the Ears in the Swiss Army.

SCHLITTLER, E.

Corr.-Bl. f. schw. Aerzte., 1917—No. 234—24.

On account of the geographic position of Basle, a large number of soldiers were stationed there ever since the beginning of the war. The ear diseases of these troops were carefully studied. The findings are of interest from different viewpoints.

From August, 1914, to August, 1916, 368 soldiers were treated; 17.2 per cent suffered from diseases of the external ear, 55.2 per cent from the middle ear, 24.8 per cent from diseases of the inner ear, and 2.8 per cent were exaggerations and simulations. Chronic affections were more frequent than acute. Acute diseases were rarer in military service than in civil life. Injuries to the ear are divided in, first, traumatic rupture of the drumhead; second, nerve deafness after trauma of the skull; third, the acoustic trauma caused by loud noises or detonations transmitted by means of the air. A traumatic rupture of the drumhead has red irregular margins during the first three or four days; later on it cannot be distinguished from a chronic perforation. Nerve deafness after fracture of the skull is usually combined with injuries to the sound conducting apparatus, or the vestibule and semicircular canals. The different tests can, of course, only be made in well equipped hospitals, which are also indispensable for treatment and the determination of questions of indemnification. It is important to know that a number of injuries which were overlooked at the first medical examination were afterwards attributed to minor injuries received in the service, and indemnities claimed. Slight deafness due to otosclerosis or spongifying can certainly be increased by overirritation. Sixty-seven of

the cases probably never had the hearing required for the service and ought to have been rejected at the first examination. The tuning fork tests give us valuable information. An interesting collection of cases is given of heredito-degenerative deafness (several sisters and brothers, hard of hearing), occupational deafness (blacksmiths, coppersmiths, etc.), of atrophy of the acoustic nerve after infectious diseases (typhoid fever) where the tuning forks gave definite information. We find here that in repeated examinations the results nearly absolutely coincide (the opposite is true of exaggerations and simulations). Combinations of middle ear deafness with nerve deafness called "dysacusis," show a loss of hearing in the upper as well as in the lower limit. There were five cases of typical otosclerosis or spongifying. Two of them were affected in one ear only. But even those ought to be excluded from military service since as a rule the disease affects both ears and is progressive.

Chronic suppurations of the middle ear were found in 59 patients, and 45 others had residues of old suppurations, together 28 per cent of all ear patients. The criterion whether a man with a perforation should be rejected or not, is the position of the perforation. It is comparatively insignificant if a man with a central perforation is accepted in spite of otorrhea. It is quite a different question in marginal perforation. Space does not permit mention of the many interesting points which are brought out in connection with this question. The last group are those patients with exaggeration and simulation. Repeated tuning fork tests and Lombard's test usually revealed the true condition very soon. One case was more difficult and more serious. The man tried to evade military service by simulating deafness. He was convicted and sentenced by court martial to three months' imprisonment and three years' loss of civic rights. The conviction was based on eight points:

1. His speech was as in a normal person.
2. Lombard's test: He raised his voice when the noise instrument is put in both of his ears during loud reading.
3. He did not turn around when a heavy body is dropped on the floor behind his back, and does not act on motions, for example, if by motion he is ordered to leave the room.

4. A siren was heard with open ears, and not when a cork or a perforated cork is inserted in both ears.

5. The man began to swallow when the physicians talk in a low voice about court martial and prison.

6. At night he woke up repeatedly from low whistling or conversation, even from simple coughing of a neighbor. If anyone told a joke, he laughs too. In awaking he once answered a question promptly and even repeated the question.

7. An acquaintance from his home town did not know that he was deaf, and a number of written certificates testify the same.

8. The functional tests with whistles and tuning forks were unreliable. The few sounds that were heard one day were not heard the next. The functions of the vestibular apparatus were normal.

During the trial before court martial he suddenly regained his hearing.

J. Holinger.

Acute Mastoiditis as a Complication of Infectious Diseases. Based on a Study of One Hundred and Twenty-three Cases in the Base Hospital at Camp Shelby, Miss.

LATHROPE, GEORGE H.

J. Am. M. Ass., Chicago, 1918—LXXI—451.

The writer presents the following conclusions: Imperfect as this study is in many respects, the following conclusions seem to me justified from the facts and analogies presented:

1. The army camp in question appears to have suffered this past winter an "epidemic" of acute mastoiditis.

2. This exhibition of mastoid infections is only one expression of the general streptococcus incidence in the camp.

3. The latter streptococcus invasion, in turn, is but a side-show in the very widespread wave of streptococcus disease throughout southern army camps.

4. It is peculiar in two points: (a) The dominant organism is the streptococcus viridans, and not a hemolyzing streptococcus, as appeared elsewhere; and (b) its chief expression is in the form of an unusually severe involvement of middle ear and mastoid tissues.

5. Measles played a prominent part in giving the streptococcus a start in its work, and stands by itself as an etiologic factor in the development of the severer types of mastoiditis.

Emil Mayer.

Wounds of the External Auditory Canal With Resulting Stenoses and Atresias.

ROZIER, J.

Rev. hebdomadaire de laryngologie, etc., 1918—XXXVIII—385.

Some fifty cases of atresia and stenosis have been operated on by Moure and his assistants. Eight of the cases are here described in detail. In brief, Moure's method comprises three important steps: (1) Enlarging the bony auditory canal by chiseling off the posterior wall down to the tympanic cavity; (2) autoplasty of the membranous canal, Moure's method, to obtain as large a meatus as possible; (3) careful attention to postoperative dressings.

Success was the rule, but one failure and two partial failures are described to show the difficulty sometimes encountered in maintaining the patency of the canal.

A. Miller.

Report of a Case of Spontaneous Rupture of the Lateral Sinus Five Days After Mastoid Operation.

By COATES, GEORGE M., AND DOYLE, JOHN H.,
Survey of Head Surgery, Surgeon General's Office,
1918—I—143.

The case reported herewith was one of great interest to us, and in respect to the spontaneous rupture of the lateral sinus is unique in our experience.

The features of the case were the presence of a streptococcus hemolyticus septicemia, and the rather prompt recovery of the patient with the formation of only one metastatic abscess.

It is needless to speculate upon the outcome if the sinus had ruptured at any other time than during a dressing when both of us were present and when immediate measures could be taken for control of the hemorrhage.

Mrs. H., age twenty-four years, wife of an enlisted man in the 28th Division of the U. S. Army, came to the clinic of the Base Hospital, Camp Hancock, Georgia, on April 20, 1918, complaining of bilateral earache following an acute rhinitis of a few days' duration, which she thought was induced by bathing in one of the near by swimming pools.

On examination, both tympanic membranes were found to be congested and bulging; there was no mastoid tenderness or sagging of the posterior canal walls.

Immediate incisions evacuated a small amount of pus from each middle ear. On the following day the discharge was free, thick and yellow, and as the earache persisted the incision on the right side was enlarged.

April 24th. Much more pain, some mastoid tenderness on the right side; right external canal somewhat contracted and discharge lessened. A double myringotomy was again performed.

The condition continued without much change until May 6th. She had been sleeping badly, and was very nervous and excitable, and, at this time, was evidently suffering considerably. The evening temperature was 102° and there was a history of a chill.

She was now removed to the Base Hospital, where a blood count showed a leucocytosis of 12,200. The right canal was more contracted than before, and the middle ear discharge scanty. On May 9th, the X-ray showed a hazy mastoid process and the white blood count was 13,000.

Under ether, a thorough simple mastoid exenteration was performed. There was no great destruction of the mastoid cells, but pus was found filling a rather large tip cell, and the cells adjacent to the antrum were necrotic.

The sinus was placed very high, encroaching greatly on the posteroinferior wall of the antrum, the latter being opened with great difficulty and only after removing a considerable area of the necrotic sinus plate. The sinus itself appeared normal, so, after a thorough exenteration of all mastoid cells the wound was swabbed with a 2 per cent iodine tincture and allowed to fill with fresh blood; after placing a small rubber tissue cigarette drain in the antrum. A continuous up-end mattress suture of silk was used for closure, after the method

of White of Washington, D. C. The temperature after operation was 100° , with a good pulse.

On the following day the temperature had risen to 101° . The external dressings were removed and the line of incision was wiped with a 5 per cent solution of dichloramin-T in chlorcozane oil. There was some discharge from each middle ear, and the hearing was markedly impaired. No vertigo or nystagmus was present, and no chills or delirium had been recorded since admission to the hospital. Bacteriologic report on the pus taken at the time of operation was that the streptococcus hemolyticus was present in pure culture.

Two days later, May 12th, there was a sudden rise of temperature to 106° (rectal), and the white blood count was 22,000. There were no eye symptoms, and the lungs were normal. An examination of the pelvic organs showed nothing abnormal.

May 13th, the temperature was 106.8° (rectal) at 5 a. m., and remained between that point and 104° all day. The patient complained of chilly sensations, but no true rigor was observed. The mastoid wound was healing perfectly at the skin incision, and the blood clot was not infected, a very small amount of middle ear discharge coming through the cigarette drain.

The left ear discharged slightly, but was evidently not the cause of the fever.

The patient looked white and pasty, and a Murphy drip was used, giving two quarts of dextrose solution in twenty-four hours. The urine was normal, showing only a few hyalin casts. Stitches were removed, the skin wound holding perfectly.

May 14th, her condition remaining much the same, the mastoid dressings were removed and the cigarette drain was lifted out without effort. Sharp venous bleeding followed within a minute, but not immediately, being controlled by packing with iodoform gauze tape, thereby displacing most of the partially organized mastoid clot. The loss of blood was not great, and the temperature soon dropped to 100° , pulse remaining good.

May 16th. The blood culture was positive for the streptococcus hemolyticus, and the temperature continuing to run an

uneven course, the right internal jugular vein was exposed, ligated and excised up to the facial. At the same time the mastoid packing was removed, but the hemorrhage was too profuse to permit of any further investigation of the lateral sinus. For the next few days the temperature gradually steadied down, though there was a daily rise to around 102°. The neck wound healed with practically no infection, and the packing from the mastoid cavity was finally removed without recurrence of bleeding on the seventh day. Hearing had improved markedly and both ears were nearly dry. In the meanwhile, however, the patient had complained of pain and tenderness in the left gluteal region, though nothing could be felt there.

On May 25th, the temperature was again between 102° and 105°; the neck wound was closed; both middle ears were dry, with 20/20 hearing, and the mastoid wound was rapidly filling in by granulation, although it promised to be unsightly owing to the hurried and long continued packing.

On June 1st, a metastatic abscess of the left gluteal region was diagnosed, and under ether was incised and drained by Major R. T. Schlueter, Chief of the Surgical Service, two ounces of creamy pus being evacuated. The mastoid wound was perfectly clean, due to the continuous use of dichloramin-T, so, under the same anesthesia, we did a plastic closure, liberating the skin flaps and bringing them together with silk, leaving a small opening for drainage at the lower end. This closure held well and the wound remained clean until final healing on June 13th, with very little deformity. At this time the patient was discharged in good health, strong and well, and proceeded to her home in the North.

Any review of the case must suggest the query as to just what the pathologic process was. In the first place we had a mild mastoid infection, although it had been very slowly progressing for about twenty days from the initial middle ear onset. The causative agent was the streptococcus hemolyticus which was later found in the blood. At the time of the operation, a necrotic sinus wall was removed, revealing an apparently healthy sinus, which bled profusely when it later ruptured; while on the other hand, the internal jugular was not thrombosed below the facial tributary. It would

appear, therefore, that it was a case of jugular bulb thrombosis, and that the pressure of the blood in the sinus above the clot eventually ruptured the weakened sinus wall, unsupported by the bony plate which had been removed. The cigarette drain into the antrum of necessity lay in contact with the exposed sinus for five days, and the hemorrhage followed soon after its removal, although it was lying loosely against the sinus.

The question arises whether the slight pressure, due to the contact for five days of the rubber drain, caused the weakening of the sinus, or whether the already disease weakened wall was kept from giving way by even the slight support afforded by the drain.

Intimate Relation Between the Ear and the Eye as Shown by the Barany Tests.

LANGDON, H. MAXWELL, AND JONES, ISAAC H., *Arch. Opth.*, New Rochelle, N. Y., 1918—XLVII—348.

Ocular equilibrium is dependent on normally functioning ears. Tonic impulses from the right ear continually tend to draw both eyes to the left, and from the left ear to the right. The anode applied to the right ear draws both eyes to the right with resulting nystagmus to the left, while the kathode has the opposite effect. So complete is the control of the ear over the eye that a nystagmus of any type and in any direction may be produced "to order" by appropriate ear stimulation. The eyes are always drawn in the direction and in the plane of the lymph movement. The nerve paths between the ear and the eye muscles, and between the ear and the cerebral cortex and the following, according to our present knowledge:

I. The fibers from the horizontal semicircular canal pass through the eighth nerve, enter the brain stem at the junction of the medulla and pons, and continue directly to Deiter's nucleus and there divide into two pathways.

a. The vestibulo-ocular tracts concerned in the production of nystagmus. These go from Deiter's nucleus to the posterior longitudinal bundle, through which they pass to the various eye muscle nuclei, from which, through the third and

sixth nerves they are distributed to the eye muscles themselves.

b. The vestibulo-cerebello-cerebral tracts responsible for the vertigo. From Deiter's nucleus this path enters the cerebellum through the inferior cerebellar peduncles to the three vestibular cerebellar nuclei of the same side, from which it proceeds upwards through the superior cerebellar peduncle and continues to the cerebral cortex from both sides, but more particularly the opposite side, through the crura cerebri. The cortical areas which receive these fibers are postulated by Mills to be the posterior portion of the second temporal convolutions adjacent to the cortical areas for hearing.

II. The fibers from the vertical semicircular canals pass through the eighth nerve and immediately ascend into the pons, and at a point above its middle they have a division into two pathways, similar to that of the horizontal at Deiter's nucleus.

a. The vestibulo-ocular tract, the fibers entering the post-longitudinal bundle to be distributed to the eye muscles.

b. The vestibulo-cerebello-cerebral tract reaches the cerebellum through the middle cerebellar peduncle, entering the cerebellar nuclei of the same side; from this point the pathway is identical with that of the fibers from the horizontal canal, through the superior cerebellar peduncle to the cerebral cortex of both sides.

The nystagmus tract is the one of greatest interest to oculists. Its integrity proves a supranuclear lesion in cases of conjugate deviation of the eyes. In cases of muscular paresis it is suggested that electrical ear stimulation might stimulate the weakened nerve fibers.

—Survey of Head Surgery, Surgeon General's Office.

Three Cases of Nystagmus in Concussion.

MOREAU, F., *Ann. d'ocul.*, Paris, 1918—CLV—236.

Case 1.—An artilleryman, nine months before, had been shocked by the explosion of a 210 shell. Coma followed for eight hours. There were no wound, otorrhagia and epitaxis. Nystagmus, however, resulted and was not modified from the beginning. It was spontaneous, with oscillations of amplitude varying from 100 to 140 a minute, the short contraction

produced by the dextrogyres in looking to the right, by the levulogyres in looking to the left. In looking down, the oscillations had a slow pendular rhythm; in looking up, there was almost a tremulousness of the globe; in convergence, the oscillations became short, of very small amplitude. Neither darkness nor a reclining position altered the character of the nystagmus. Lumbar puncture had no influence. Horizontal oscillatory movements of the head were present, yet it could not be affirmed that they were synchronous with the movements of the globe. In spite of the absence of ocular lesion the visual acuity was scarcely 0.2 right and left. The vision was not modified in looking upward or downward. Accommodative asthenopia appeared rapidly. With the stereoscope there was intermittent fusion; with the diploscope, absence of binocular vision. Visual fields and chromatic sense were normal. There was no other result of the trauma than the nystagmus. Hearing was normal and otologic examination revealed no affection of the vestibule.

Case 2.—Two years before, the patient had been buried by the explosion of a shell. There was no wound. He was evacuated to the hospital with complete paralysis of the limbs and a state of obnubilation with nystagmus. Following several lessons in reeducation, gait improved and became normal rapidly.

The nystagmus appeared immediately after the trauma. At the ambulance station the patient saw the rows of beds dance. The nystagmus had never changed. The oscillations were large, rapid, horizontal, spontaneous, continuous. The visual acuity was 0.25 right and left. The patient has at times had brief attacks of visual clouding (obnubilation). There was no ocular lesion; no fusion with the stereoscope; but there was a homonymous diplopia. The aurists, after several examinations, could not ascribe a vestibular origin.

Case 3.—Concussion twenty-one months before by the explosion of a shell. No wound present.

There was a nystagmus with vertical oscillations which were not modified by changes in the position of the head. Palpation through the closed lids revealed the persistence of the oscillations of the globe. The rhythm was regular. Several lumbar punctures did not modify the nystagmus. Ac-

companying the movements of the eyes there were present vertical oscillations of the head, the synchronous character of which it was difficult to fix. There was also a homonymous diplopia; no ocular lesion; visual fields were normal; pupils normal; vision right, 0.5; left, 0.7.

Otologic examinations by two aurists revealed probable lesions outside of or below the labyrinth, the latter being intact. The patient was able to stand only with crutches, and to walk with their aid by pushing forward his legs.

In these three cases of nystagmus, the labyrinth could not be held responsible by otologists nor could a localization be established by neurologists. They followed trauma, were permanent, constant, without variation, lasting one year, twenty-one months and nine months, respectively, and were not influenced by lumbar puncture. There was a reduction of vision, not progressive, and without ocular lesion, the case of vertical nystagmus being the least marked. To this diminution of vision there was added, in two of the cases, a homonymous diplopia which persisted without variation since the first examination. Finally the writer does not attempt a pathogenic hypothesis nor identify the facts of the syndrome with Deiter's nucleus.

—Survey of Head Surgery, Surgeon General's Office.

Some Phases of the Vestibular Nerve Problem.

DUNN, JOHN, Arch. Ophth., New Rochelle, N. Y., 1918—
XLVII—354.

If the head is held erect in the so-called optimum position, and is turned to the right, the eyes move to the left, there is an excess of movement in the endolymph, confined to horizontal canals, and there are necessary body and extremity adjustments. These three form a trinity called into existence by every movement of the head on the vertical axis. The proper correlation of these three elements is brought about by the cerebellum. Its function is to make possible the exact performance of any desired—i. e., willed, motion, but it does not originate movements. In addition to the stimuli originating in the cerebrum to accomplish an act or voluntary movement, the cerebellum receives stimuli from the sensory nerves

supplying the muscle, joints, etc., affected by the movement, which stimuli reflexly cause the act or movement to be prolonged until another willed movement takes its place. The adjustment of the body and extremities, the ocular movements, and the aroused vestibular sensations are independent of the will and beyond its control when once the machinery of the act—e. eg., turning the head, has been set in motion. To this end connections have been developed between the cristæ of the horizontal canals and both the cerebellar cortical centers and the vagic ocular centers. A similar connection has arisen between other of the canals and the cerebellum and optic centers to permit other movements of the head. Only those cerebellar centers respond to vestibular peripheral irritation which have been developed along with and are of a necessity a part of the vestibular trinity complex—i. e., these centers whose hyperexcitation produce body falling and past-pointing of the type made manifest by irritation of the cristæ. Others are directly associated with the cerebral motor cortical centers.

The primal eye was a part of the vegetative system and was under the control of the vagus centers. In its development it has also come under the control of the will, so that excitation of the vestibular terminals result in impulses to both the vegetative ocular nuclei and the voluntary nuclei. Thus the nystagmus has a double element. The one results from a hyperexcitation of the primary stem centers so that it is possible to have a nystagmus, even in deep unconsciousness. The other results from overexcitation of the centers which have developed as the result of willed control over the external ocular muscles. Their manifestations follow the same rules which determine the direction in past-pointing and body falling. When the eyes are fixed and the head is moved the eyes move in the opposite direction with a slow, pendulum-like movement, but when the head is fixed and the eyes move, the movement is jerky. The former is under the control of the voluntary nuclei. In nystagmus the slow movement represents the response to irritation of the vagi nuclei. The rapid movement represents a post-pointing of the eye and necessitates an element of the will for its performance.

Movements of the eyeball, whether normal or pathologic—

e. g., albinism, do not give sensation of the movement of external objects, but vestibular nystagmus always does. Two cases of vertigo are described and analyzed, and lead to several questions: What are the functions of the utricle and saccule, and why is the vestibular never divided so that some fibers go to the utricle and the vertical canals, and some to the saccule and the horizontal canals. Why should nausea and vertigo be a sequence from the ear? Do there pass centralward from the cristæ, fibers some of which are destined to arouse stimuli in the oculomotor centers, others to assist through the cerebellar centers in stabilizing the head, spinal cord and joints of the extremities for the fullest performance of willed movements of these parts? Can nausea be induced by disturbance of the cristæ nerve end alone, or it is a manifestation of disturbance of the otolithic branches of the saccule? (and utricle?) What are the effects upon the endolymph, beyond the semicircular canal, of disturbances of the endolymph within them?

—Survey of Head Surgery, Surgeon General's Office.

Brain Abscess With Autopsy Findings.

WOOD, GEORGE B.,

Survey of Head Surgery, Surgeon General's Office,
1918—I—193.

1. This case is reported because of the large size of the abscess, its relation to a frontal sinusitis and because of the interesting pathologic findings.

2. Private S. M., 21st Company, 154th Depot Brigade, age twenty-five years, white, was admitted to the U. S. Army Base Hospital, Camp Meade, on July 23, 1918, with a diagnosis of acute frontal and maxillary sinusitis, right side.

History.—He entered the service one month previous to his admission to the hospital and, according to a letter from his sister, although he had never been very robust and suffered more or less from gastric disturbances, he had never had any headache or other symptoms of sinus trouble up to the time of being drafted. Patient stated that he had suffered from headache occasionally since being in camp, but not severe enough to report to sick call. On July 14th, although he had

a "cold in the head," he received his third typhoid inoculation. That afternoon he had a sharp pain over the right eye, which kept up more or less constantly until his admission to the hospital. Also he developed a fairly copious mucopurulent and bloody discharge from the right side of the nose.

Family History.—Negative.

Personal History.—Smallpox at nine years of age, chickenpox at eleven years of age and gonorrhea eight years ago.

Condition on Admission.—He had severe right frontal headache, the pain extending into the right eye. His mentality was good, though he seemed somewhat apathetic. Heart and lungs were normal, as were also the abdominal viscera. Temperature was 101° , pulse 78, and respiration 22. Leucocyte count 15,000, 67 per cent polymorphonuclears, 31 per cent small mononuclears, and 2 per cent large mononuclears. There was marked edema over the right frontal sinus with possible fluctuation, just above the external limit of the eyebrow. The upper lid was only slightly edematous.

The left nasal fossa was normal, and the right nasal fossa was also normal except for a small drop of pus under the anterior end of the middle turbinate. The X-ray examination showed the right frontal anterior ethmoidal and maxillary sinuses cloudy and the left side clear. The frontal sinus was very large, extending almost to the end of the eyebrow, with an extension running well back over the orbital cavity. On July 24th, under cocain anesthesia, a Mosher intranasal anterior ethmoidectomy was done and the right frontal sinus freely opened. A copious discharge of pus took place, and the patient experienced immediate relief from headache. Temperature that evening was 100.6° , puls 88 and respirations 20.

On July 25th, the edema of the upper eyelid was more marked, and there was distinct fluctuation just above the external limit of the eyebrow.

An external frontal sinus operation was done under ether. A subperiosteal collection of pus was found external to the bone without any recognizable communication with the frontal sinus cavity. The external abscess was thoroughly opened by an incision which was carried upward from the outer part of the brow incision. The greater part of the external wall on the frontal sinus was removed and a large opening was made

into the nose by rasping down the nasal process of the superior maxillary. A large rubber drainage tube was placed in the sinus and brought out the nose. The brow incision was closed and gauze drainage inserted into the external abscess cavity.

July 26, 1918. Patient comfortable, temperature 101°, pulse 90; free drainage from nasal tube.

July 29, 1918. Wound apparently doing well, except that there was some retention of secretion in the external angle, necessitating the insertion of a rubber drainage tube. Highest temperature 101°, pulse 99.

July 31, 1918. First noticed evidence of mental sluggishness. Evening temperature 99°, pulse 62. Leucocyte count 16,000, polymorphonuclears 67 per cent, small mononuclears 24 per cent. Culture from frontal sinus showed the staphylococcus albus and streptococci. Lumbar puncture showed the spinal fluid to be under slight pressure with a cell count of 64 per c. mm., and there was a slight globulin reaction.

August 1, 1918. Marked mental depression, with slight headache. Pulse distinctly slow, varying between 48 and 54, temperature 98 to 99.4 degrees. Vomited once after eating and passed urine involuntarily. Leucocyte count, 18,400.

An exploratory operation was done by Major Charles H. Frazier. The anterior wall of the frontal sinus was completely removed. A moderate amount of pus was still present in the sinus, and there was granulation tissue in the region of the nasal opening and toward the external angle of the sinus. After enlarging the perpendicular incision upward, the skull was trephined one inch above the upper limit of the frontal sinus, slightly external to the midbrow line, and the dura uncovered downward until the internal wall of the frontal sinus was reached. There was a small osteomyelitic dura at the upper margin at the internal wall of the sinus, and beneath this the dura seemed somewhat thickened and congested. There was no extradural collection of pus, but there was little if any pulsation of the dura. A hypodermic needle was introduced through the dura with negative results. The wound was packed with iodoform gauze and one or two sutures inserted through the brow incision at its inner end. After the operation the pulse rose to 78, but rapidly dropped during the night to 60.

August 2, 1918. Patient comatose, though he can be partially aroused. There are periods of extreme restlessness with some jactitation. Involuntary urination. At the suggestion of Major Frazier, a lumbar puncture was done, showing spinal fluid under pressure. Patient, however, went into collapse, and in spite of artificial respiration and atropin and adrenalin in the cardiac muscles, died with respiratory failure.

3. I am submitting herewith, as an enclosure, a report of the autopsy done about two hours after death by the Chief of the Laboratory Service.

The pathogenesis of the brain abscess in this case is somewhat obscure, though the probabilities are that it was secondary to the frontal sinuitis. It is also probable that the abscess had been forming during a considerable length of time, three or more weeks, as there was a distinct limiting wall, as shown by the marked polymorphonuclear infiltration surrounding it. It would seem impossible that an abscess as large as this one was, with a definite limiting wall, could have developed after the acute symptoms of his frontal sinus were first manifested. Hence we are inclined to believe that the acute attack was superimposed on an old lesion, though when the sinus was first opened the appearance suggested an acute process more than a chronic one. There was very little thickening of the lining mucosa, and granulation tissue was present only around the opening into the nose and externally in the region nearest to the external abscess. At that time a careful examination of the internal wall of the sinus failed to reveal any area of necrosis, though at the last operation a small osteomyelitic spot was found leading directly to the thickened dura, and it is possible that this existed at the time of the first operation without its being detected. The difficulty of detecting the point of invasion through the bone in this case was demonstrated by the failure to find any communication between the frontal sinus and the external abscess, although a most careful search was made for such an opening.

This case further demonstrates the difficulty in diagnosing an abscess of the frontal lobe in an early stage. The first symptoms indicative of intracranial lesion were first noticed only two days before his death. Although on admission the patient seemed somewhat apathetic, there was no distinct

mental sluggishness, and there was no slowing of the pulse until August 31st. Further the headache from which he suffered severely on admission to the hospital, was entirely relieved by the intranasal operation and returned only, and that to a slight degree, on the day before his death.

While it is unfortunate that the abscess was not found when the frontal bone was opened, it is doubtful whether more than temporary relief could have been obtained, as a microscopic examination of the brain tissue showed that throughout the whole frontal lobe there was marked cell degeneration, focal necrosis and polymorphonuclear infiltration. The bacteriologic examination of the abscess contents was of special interest, because there was found in connection with the streptococcus viridans a fusiform bacillus, which could be cultured only by anaerobic methods and which has lately been found quite frequently in abscesses of the brain.

AUTOPSY REPORT, by GEORGE S. MATHERS, Captain, M. C.

1. Herewith is enclosed the autopsy report on S. M., Private, 21st Co., 154th Depot Brigade, who died August 2, 1918, at the Base Hospital, Camp Meade, Md.

2. Autopsy A-48, S. M., Private, 21st Co., 154th Depot Brigade, made August 2, 1918.

The body is that of a moderately well nourished young white male, weighing about 130 pounds and about twenty-five years of age. Body heat was still present and the postmortem rigidity had not appeared.

The hair was cut short. There was a large blood stained surgical dressing over the right frontal region of the head. Over the right eye, just above the supraorbital ridge, there was an open surgical incision. This incision is "T"-shaped, with the lateral line of the "T" being parallel with the right supraorbital ridge and the perpendicular line extending upward about five centimeters over the frontal protuberance. The incision extends through the soft tissues, and there was an absence of the frontal bone in the region of the right frontal sinus. The edges of the wound are covered with a new granulation tissue, and there is some seropurulent material in the wound. A long iodoform gauze pack was recovered from the upper line of incision, which had been closed

with three silkworm gut sutures. The tissues of the scalp in the region of the operative wound are markedly edematous.

On opening the skull, the dura is hyperemic. The brain in the right frontal region is swollen, pale greenish yellow in color, and fluctuates. The dura is attached to the brain at one point—the cerebrum near the upper end of the surgical incision, and when the attachment is broken a thick greenish yellow purulent material exudes from the brain. There is no gross evidence of meningitis, except where the cortex is attached to the meninges as described above.

There is a very small amount of yellow purulent material in the left sphenoid sinus. The left frontal sinus, the middle ears and antrums are unchanged.

The brain is about normal in size and symmetrical, with the exception that the superior frontal surface is flattened and fluctuates. The external appearance of the brain substance in this region is a yellowish green color and has a semi-translucent appearance. On section a large abscess was found in the right frontal lobe extending from the anterior tip of the lobe to the plane of the central fissure. In its longest diameter it is about 7.5 centimeters, and in its transverse diameter it is about 3 centimeters. The wall of the abscess is blood stained, and there are marked gross changes in the brain tissue in the region of the abscess. The abscess cavity contains a thick greenish yellow pus. There were no other gross changes noted in the sectioning of the brain.

Microscopic examination of the brain tissue in the region of the abscess revealed a marked polymorphonuclear infiltration of the cortical substance forming the wall of the abscess, which became less pronounced as the external surface of the brain was approached. Throughout the whole front lobe, however, on the right side there is marked cell degeneration, focal necrosis and polymorphonuclear infiltration. Stained smears of the purulent material from this abscess showed Gram positive micrococci in pairs and chains, and small Gram negative fusiform bacilli. Subsequent cultures of this material yielded a streptococcus viridans and a fusiform bacillus. The fusiform bacillus was recovered by anaerobic cultural methods. A streptococcus viridans was also recovered from the wound.

Anatomic Diagnosis.—Recent surgical operative wound of the tissues of the right frontal region; absence of a portion of the frontal bone in the region of right frontal sinus; right frontal sinusitis; large abscess of the right frontal lobe of the brain; edema of the tissues of the scalp; sphenoid sinusitis; needle puncture wounds of the dura; marked edema of the lungs; marked hyperemia of the kidneys; fibrous adhesions between the visceral and parietal pleura; missing teeth.

Medical Problems of Aviation.

BERNARD, A., *Progrès méd.*, Paris, 1918—XXIII—166.

The aviator's physician is concerned with many problems other than those of altitude, etc. No physician can tell whether a soldier will make a good aviator, for time and the work alone will tell, but certain moral and physical attributes should be predicated. The best age is between eighteen and thirty. Any hernia should be noted, so that it cannot be used later as an excuse for leaving the service.

Flaccid abdominal walls may lead to syncope during a rapid maneuver. Head injuries contraindicate. Most of the work is done with the arms and hands, therefore injuries of the lower limbs may not incapacitate. Alcohol and excessive smoking cause dyspnea, palpitation and diplopia. Untreated or imperfectly treated syphilitics are barred until after intensive prolonged treatment. Malaria, epilepsy, tuberculosis, bronchitis, pleurisy and asthma are contraindications. Seasickness is not a bar, as it is rarely observed during flight. Albuminuria and glycosuria are absolute bars. The whole respiratory system should be in the most perfect condition, because of the atmospheric rarefaction at great heights. The applicant should be able to hold a full inspiration for forty-five seconds. Exaggerated reflexes, tremors, insomnia and excitability predispose to air neuroses. Sight should be perfect. Glasses are not desired, as they may be lost or broken. Stereoscopic and color vision are important. Night blindness must be looked for in those selected for night flying. Latent hyperopia and strabismus are among the causes of bad landings. Deafness in either ear, suppurative otitis media, perforation of the drum are causes for rejection. Equilibration

and muscle sense should be carefully tested. Psychomotor reactions should be investigated; the average reaction to a visual impulse is 19/100 second; auditory and tactile, 14/100 second; and retardations of 22/100—45/100, 20/100—39/100 and 20/100—39/100, respectively, may be due to fatigue, excesses, sickness or cold; the pilot should not fly until after another examination. The physician should live among the students during training and observe them all the time. In mounting up to 1,500 meters the respiratory cavities become congested; the aviator is relieved by mouth breathing and practicing valsalva. At 4,000 meters the troubles disappear. The same phenomena occur on descending. Most accidents occur in landing and are due to lack of binocular vision, to fatigue, fear or illness.

—Survey of Head Surgery, Surgeon General's Office.

II.—NOSE.

Secondary Infection Following Intranasal Operation.

WOOD, GEORGE B.,

Survey of Head Surgery, Surgeon General's Office,
1918—I—141.

It was noted that during the month of May secondary infections after intranasal operations at Camp Meade occurred with such frequency as to make it advisable to postpone all septal operating except in the more urgent cases.

1. The majority of cases of secondary infection, usually tonsillitis following intranasal operations, such as submucous resection of the nasal septum, were due to the streptococcus hemolyticus. It was noted that this complication was apt to develop when a case of infection from this organism got into the ward where the operative cases were. During the month of June there were eleven submucous resections done without a single case of tonsillitis developing. Early in June an acute mastoid infected with the streptococcus hemolyticus was admitted to the ward, and up to July 18th, seven out of ten submucous resections developed tonsillitis. Since then three cases have been operated on without tonsillitis.

2. Recently cultures have been taken before the operation to determine whether carriers of the streptococcus hemolyticus were more subject to tonsillitis infections, following the above operation, than were the noncarriers. The number of these cultures is too small to justify any conclusion, but the data are submitted to date as a preliminary report:

		Cultures from—		
Operation	Throat	Right	Left	Tonsil-
		Nose	Nose	litis
Submucous resection....	Neg.	Neg.	Neg.	None
Submucous resection....	Pos.	Neg.	Neg.	Yes
Submucous resection....	Pos.	Pos.	Pos.	Yes
Submucous resection....	Neg.	Neg.	Neg.	Yes
Submucous resection....	Pos.	Pos.	Neg.	None
Submucous resection....	Pos.	Pos.	Neg.	None
Submucous resection....	Neg.	Neg.	Neg.	None

3. It was thought possible that normal individuals might act as streptococcus carriers and introduce the organism into the operative wards. Memorandum from the Chief of the Laboratory Service, U. S. Army, Camp Meade, Md., concerning this matter is herewith submitted.

4. It is my belief that if acute infectious cases can be kept away from the operative cases, the incidence of tonsillitis following nasal operations will be greatly decreased, if the complication is not entirely avoided. It is realized, however, that this is, at times, practically impossible and that constant vigilance is necessary to prevent the infection getting into the wards.

5. There has been no reason to believe that the technic used in these operations had any influence on the subsequent development of tonsillitis. The attack usually began about the fifth day after the operation.

Report by Capt. George S. Mathers, M. C., Chief of the Laboratory Service, Camp Meade, Md.:

1. To obtain more accurate data upon the incidence of streptococcus carriers among soldiers at Camp Meade, Md., cultures have been made of the throat and tonsillar crypts of 100 normal individuals. In this work, with the assistance of Major Wood, Chief of the Nose and Throat Section, the

tonsils and nasopharynx were carefully examined and the pathologic findings noted. Cultures were made from the external surface of the throat and pharynx. The surface of the tonsils were then painted with tincture of iodine, and material was also planted on blood agar plates. Controls of this technic proved that the results obtained could be relied upon. Of the 100 men cultured in this manner, 30 harbored hemolytic streptococci in their throats; while 36 held positive cultures from their tonsils. In seven instances the throat cultures alone were positive, and in fourteen instances the tonsils alone gave results. When hemolytic streptococci were found in the cultures from the surface of the throat the number of them were usually small. While in the instance of the tonsil cultures the hemolytic streptococci was the predominating organism when present. The common condition, however, was a positive throat and tonsil culture in the same individual; furthermore, in practically all cases in which streptococci were found in throat and tonsils, the tonsils were either moderately or greatly enlarged. These observations suggest that the tonsils play an important rôle in the harboring of hemolytic streptococci in the human body. This seems more probable because cultures made from the tonsils removed at operation yield hemolytic streptococci in almost all instances.

Systemic Manifestations of Chronic Nasal Sinus Infection in Childhood.

BYFIELD, ALBERT H.

J. Am. M. Ass., Chicago, 1918—LXXI—511.

The following are the writer's conclusions:

1. Infection of the accessory nasal sinuses is greater than has hitherto been commonly suspected.
2. The possibility of this infection as a source of general bodily involvement deserves more attention. In a series of cases including chronic digestive disturbances, persistent cough, occult temperature, poor general health, asthma, infectious deforming arthritis and cyclic vomiting, sinusitis has been observed, and a definite relationship between the infection and certain metastatic processes has been established.

3. Symptoms, such as chronic purulent nasal discharge (especially in winter), sneezing, headache, depression and irritability suggest the possibility of an infection of this region, provided that other etiologic factors have been excluded.

4. The diagnosis may be made by the roentgen ray, but exploratory puncture or even curetting may be necessary.

5. The treatment should be conservative and expectant unless the trouble persists and continues to affect unfavorably the health of the patient. In the light of our present knowledge, surgery is then indicated. Emil Mayer.

Contribution to Nasal War Surgery: Fracture of the Malar Bone, Floor of the Orbit and Ethmoid of the Left Side Caused by a Shell Fragment Passing Through the Maxillary Sinus. Operation Through the Natural Passageway.

BOBONE, T.,

Boll. d. mal. d. orecchio, d. gola, e. d. naso,
Firenze, 1918—XXXVI—25.

September 26, 1917, a soldier, twenty-five years old, entered the ophthalmic hospital at San Remo. Had been wounded June 16th by a shell fragment penetrating 32 millimeters from the external angle of left eye and 20 millimeters below the horizontal portion, passing through this angle. Pus flowed from the wound of entrance, which was of the size of a pea. Below the left eye there was a fistula discharging pus continually. Near the second molar there was another fistula discharging pus. Copious pus discharge from the left nasal cavity. Rhinoscopic examination showed the ethmoid on the left side was transformed into a cavity filled with pus. The zygomatic region and the cheek were swollen and painful. The patient brought with him an X-ray picture which showed three metallic fragments, the largest the size of a lentil, in the neighborhood of the orbit, but the picture was taken from the right to the left, and did not give the exact position.

An external ethmoidectomy after Moure might have been performed, but to avoid any disfigurement the natural route was selected. The head of the middle turbinate was removed, and two days later a spur on the septum was excised, as well as part of the inferior turbinate. At several successive sessions the sequestræ of the ethmoid and granulations were

removed by means of Hajek's hook and Luc's forceps, resulting in good drainage. All the fistulae disappeared, and a complete cure was obtained. The metallic fragments were not found, but they may have passed off with the pus unobserved.

—Survey of Head Surgery, Surgeon General's Office.

III.—PHARYNX AND MOUTH.

Apothesine and Adrenalin Anesthesia in the Removal of Tonsils.

COLEMAN, JOSEPH.

Med. Rec., New York, 1918—XCIV—413.

Apothesine is the name given to the hydrochlorid of gamma-diethyl-amino-propyl cinnamate. It depends for its anesthetic qualities upon the esterification of an alcohol by an organic acid. The principal groups in its structural formula are the radicles of propyl alcohol and cinnamic acid. Apothesine combined with adrenalin is used.

The patient is given a hypodermic of morphin, grain 1/4, with atropin, grain 1/120, about twenty minutes before the operation. About ten minutes after the hypodermic the anterior pillars of the fauces, the uvula and the posterior pharyngeal wall are brushed with a cotton tipped applicator moistened in 10 per cent cocain solution. This is repeated three or four times until the patient ceases to gag from the application. The anesthetic solution should be freshly prepared by dissolving three tablets in ninety minims of saline solution and bringing the solution to a boil. The first point of injection is at the uppermost part of the anterior pillar, and care must be taken not to insert the needle too deeply, or the fluid will run out. The needle is inserted in such a way that it can be readily seen through the translucent membrane, and in this position about five drops, or enough to form a good sized bleb, are injected. Injection is then continued downward, and each succeeding insertion of the needle is made within the bleb last formed. One of the important points for injection is the lowest part of the anterior pillar, where it joins the base of the tongue. If this region is not thoroughly desensitized, intense pain will be caused by cutting through with the snare wire. The anterior pillar being thoroughly injected, we now carry

out the same procedure in the posterior pillar, except with the latter being shorter and more difficult to inject, two injections will suffice. Both sides are injected before the operation is begun. It is unnecessary to inject into the tonsils. In all cases desensitized in this manner inquiry was made at each step of the operation to find if the patient had any pain, and invariably the reply was that nothing could be felt. Enucleation can begin as soon as the injection is complete, because anesthesia is immediate, and there is no occasion for waiting as when cocain is used. The technic of operation does not differ from that used by other operators with cocain anesthesia. In children, for obvious reasons, the use of general anesthesia is advised. It was remarkable how little these cases bled, both during and after operation, and how little postoperative shock any suffered. The amount of inflammatory reaction was slight and healing rapid. Anesthesia seemed to last about one and a half to two hours. These operations were all done in a sitting posture. Since there is no danger of toxicity, it is well to distend the pillars with the apothesine-adrenalin solution. In ten cases the entire quantity made up (ninety minims) was injected. Six were women. The youngest was a girl of sixteen.

Summary.—1. The apothesine solution can be freshly prepared and easily sterilized without deterioration.

2. It does not produce sloughing, although considerable tension is made in the tissues.

3. The solution may be used in any reasonable quantity, no toxic effect being observed after the use of five ounces.

4. With proper care in the technic of infiltration the operation can be performed without the slightest pain.

5. Reaction is slight, and most patients are able to take food in a day or two.

Emil Mayer.

Report of a Case of Primary Tuberculosis of Faucial Tonsils.

OERTEL, T. E., AND GRIOT, GEORGE A.

J. Am. M. Ass., Chicago, 1918—LXXI—968.

Male, aged twenty-six years, in December, 1917, had an attack of tonsillitis of a type unknown to him, lasting about two weeks. He had not recovered completely from this attack,

as a soreness had persisted in both tonsils, more pronounced in the left, until the time of consultation, March 7, 1918. Also he had noticed a swollen condition of the left tonsil, which had persisted since the attack of tonsillitis in December, 1917. Four weeks previous to consultation he had complained of hoarseness which would last for a few days, then subside for a day or two, and again recur. For the previous two weeks hoarseness had been constant, growing progressively worse. Eating sour fruits, such as lemons or grapefruit, caused irritation of the throat, but did not cause coughing.

The epiglottis was very much enlarged, about half an inch in thickness, and presented a large eroded area on the left side. It was anemic and covered with granular masses, the size of small birdshot, yellowish and semitranslucent. A mucopurulent secretion was noted, covering both the epiglottis and the structures of the larynx. The arytenoid cartilages were very much enlarged. The left was much larger than the right, having a distended appearance, as though it were filled with air. The left vocal cord was swollen, with a large ulcerated area near the middle and much elevation along the edge. The right cord was not much thickened and presented a small, ulcerated area where it approximated the ulcer of the left cord. The trachea presented a thickening of the rings immediately below the left vocal cord. In the right lung fine râles were audible in the supracapsular space after cough. In this region, over an area the size of a dollar, vocal and tactile fremitus was slightly increased. The left lung was negative.

The right tonsil was the size of a small hickorynut; the posterior third presented an ulcerous excavation, bandlike in form, with the surface roughened and studded with numerous little yellowish elevated nodules, the size of a mustard seed shot, and extending from the upper to the lower pole, taking in the posterior third from the apex of the pillars to the base of the tonsils. This ulcerative process had eroded the parenchyma almost to the capsule. A small remnant of the parenchyma remained on the posterior pillar. The pillars showed no departure from the normal.

The left tonsil presented an ulcerated area, triangular in form, covering the anterior two-thirds of the tonsil below, and leaving a small portion of tonsillar tissue posteriorly un-

affected. The depth of the ulcer and its appearance were similar to those already described in the right tonsil, with this difference, that considerably more tonsil tissue was destroyed. Perhaps this would indicate that the infection had existed primarily in the left tonsil. The cervical glands were palpable on both sides and slightly enlarged. The submaxillary, axillary and inguinal glands were negative. The temperature ranged from normal to 99.2 degrees F.

Both tonsils were removed March 9, 1918, under general anesthetic by dissection and snare. There was very little hemorrhage, and the fossæ presented a smooth appearance.

The capsule showed an uneven surface. The inner surface of the tonsil appeared uneven and granular, and of a mottled dark red, with points one millimeter in size and almost white. The mucous membrane was apparently entirely eroded. The left tonsil resembled the right, but was not quite so thick. In the microscopic examination, tubercle bacilli were found in mucus recovered from the larynx.

The patient was sent to a tuberculosis sanatorium March 28, 1918.

(The history as here presented does not seem to warrant the title of this paper.—E. M.)

Emil Mayer.

Systemic Manifestations of Disease in the Throat.

PFINGST, ADOLPH O.

Am. J. Surg., New York—1918.

One of the most valuable signs indicative of tonsillar infection is glandular enlargement in the neck, more especially the gland lying in the angle between the facial and internal jugular veins below the angle of the lower jaw. As this gland forms the first relay of the lymphatic vessels emanating in the tonsil fossa, it readily becomes enlarged and oftentimes tender to the touch during tonsillar infection, and hence furnishes a valuable aid in identifying the tonsils as a source of systemic infection.

Whenever the tonsils can readily be recognized as the foci of infection, in cases of systemic disease, their removal is imperative and should be urged; but not before other structures in the body which are frequently the sites of focal infec-

tion are eliminated. In the absence of sinus disease, with no alveolar abscess, or pyorrhea alveolaris, and with reasonable assurance that the alimentary and genitourinary tracts are not at fault, it would seem that tonsils and adenoids should be removed in cases of systemic involvement, even in the absence of any history of tonsillar disease, and in the absence of any apparent trouble in these structures.

Emil Mayer.

A Study of Diphtheria Carriers in a Military Camp.

KEEFER, FRANK R., FRIEDBERG, STANTON A., AND

ARONSON, JOSEPH D.

J. Am. M. Ass., Chicago, 1918—LXXI—1206.

The writers present the following conclusions:

1. A single negative culture is only of relative value, as is shown by the fact that preoperative cultures, taken from tonsils that later proved positive for diphtheria, were negative in 22.8 per cent of the cases.
2. The importance of nasal cultures is shown by the fact that in routine cultures taken from carriers, 26 per cent were positive from the nose.
3. Cultures from chronic carriers should be tested for virulence.
4. The carrier state is maintained by some underlying pathologic condition of the affected tissues.
5. In the great majority of cases the carriers harbor the bacilli in the tonsils; a few carry the germs in the nose only; a small group maintains the infection in both nose and tonsils.
6. Conclusions based on the results of local treatment should be founded on careful and prolonged bacteriologic study. Cultures should be taken immediately before treatment, or, if local treatment is being administered, this should be suspended for a number of days before cultures are taken. The results of local treatment are problematical, since the organisms are situated deeply in the tissues.
7. In persistent carriers in whom the focus of infection is the tonsil, enucleation offers the only certain procedure for terminating the carrier state.
8. The most persistent nasal carriers are those in whom chronic inflammatory or atrophic processes are found. It is

impossible, in view of the varying culture returns, to state when the condition has finally cleared.

9. Centralization of authority is necessary for the control of an epidemic of diphtheria and diphtheria carriers in camp. Release of patients from quarantine should be under the supervision of the laboratory.

10. During an epidemic, patients should not be admitted to a clean ward unless they have had at least two successive negative cultures from the nose and throat.

11. Improperly constructed and improperly worn masks give a sense of false security.

12. The hospital personnel should be given a Schick test, and those giving a positive reaction should be immunized with toxin antitoxin mixture.

13. Toxin for the Schick test should be prepared fresh, and no diluted toxin should be used after twenty-four hours. The undiluted toxin should be kept in the dark and in a refrigerator.

14. Intermittent chronic carriers should be employed as attendants in diphtheria wards or in quarantine camps. They should be separated from the hospital personnel and from their organizations.

15. Diphtheria patients may be discharged from the hospital after they have had at least three negative cultures at three-day intervals. Chronic carriers should not be discharged until cultures taken over a long period of time prove consistently negative.

Emil Mayer.

Mumps and Myocarditis.

PUJOL, M.

Arch. de méd. et de phar. mil., Paris, 1918—LXIX—4.

The writer has encountered nine cases of myocarditis among 450 men with mumps, but some other cause seemed to have cooperated in six cases. In three cases, however, the mumps seemed to be alone responsible for the myocarditis. The three men recovered, but were unable to resume active service and were given sedentary positions. In two of the cases the heart symptoms attracted attention at the height of the parotitis. One man complained of dull retrosternal pain and a few painful extrasystoles. In all, the heart action was extremely weak.

This was not noticed in repose, but the reserve force was very small, and gave out at any slight exertion, with dyspnea, precordial pain and pounding in the chest when the man tried to climb stairs, carry his bed roll or march. The physical signs are minimal, merely a variable degree of tachycardia, but functional tests readily reveal the depreciation of the organ. It is futile to attempt to return such men to active service; they merely return to the hospitals again after a change of sectors or an affaire. Only the milder cases can be returned to their posts with request that they be spared all but light duty. On the other hand, complete dismissal from the army is only exceptionally called for.

Emil Mayer.

**Perforating Ulcer of the Hard Palate Resembling Tertiary Syphilis
but Due to a Fusospirillary Invasion (So-called
Vincent's Angina.)**

BARKER, LEWELLYS F., AND MILLER, SIDNEY R.

J. Am. M. Ass., Chicago, 1918—LXXI—793.

A man, aged forty-seven years, consulted one of us because of an ulcer, which had made its appearance on the roof of his mouth. His previous history was in all respects negative. One day he noticed a little soreness on the roof of his mouth, and a small white spot, to which he paid no particular attention, until within a few days an ulcer developed, gradually becoming larger and more painful. Despite his negative history, a syphilitic condition was suggested by several physicians.

Physical examination revealed slight anisocoria, rather marked oral sepsis and gingivitis, especially around the posterior molars, an unpleasant, fetid odor to the breath, and a well defined, punched out ulcer, about the size of a dime, situated on the hard palate, covered with a thick, creamy, easily removed exudate, and surrounded by a deep red, somewhat indurated areola. The base of the ulcer bled easily. The clinical picture certainly justified the suspicion of syphilis, a view concurred in by a nose and throat specialist. The patient was afebrile and not sick.

Laboratory studies revealed a normal blood picture, and the Wassermann reaction was negative with each of three different sets of reagents. Smears made from the exudate showed

enormous numbers of bacilli fusiformis, and many coarse, readily stained spirochetes, presenting from five to eight wide undulations. A diagnosis of so-called Vincent's angina was made, and the lesion promptly healed in a few days under treatment with dichloramin-T and local applications of concentrated arsphenamin solutions. There has been no recurrence.

Though infrequently mistaken for other conditions, the diagnosis of Vincent's disease, and particularly of Vincent's angina, is relatively easy and should present no difficulties. The essential points always to be borne in mind are:

1. The usual disproportion between the constitutional symptoms and the appearance of the lesions. "The patient should be sicker than he is."

2. The clinical history.

3. The negative laboratory findings with the one exception of smears made from the ulcerative lesion.

Evidence has accumulated in the last few years to show that ulcerative lesions of the mouth and throat of a nonsyphilitic nature are extraordinarily common among the Allied troops. These conditions are the cause of much unnecessary and expensive invalidism; they are probably wholly preventable and hence not to be tolerated. Military and civil practitioners should constantly bear in mind the following well established points:

1. Vincent's disease is in all likelihood a primary periodontal gingivitis, occurring frequently in certain particular areas, liable to develop anywhere in ill kept mouths, associated with characteristic gum lesions, and capable of spreading to any part of the buccal cavity or throat. The disease is both infectious and contagious.

2. The lesions most often seen clinically are ulcerations of the tonsils, to which the name "Vincent's angina" should be restricted.

3. No matter where located, the lesions of Vincent's disease are caused by the activities of the bacilli fusiformis and an associated spirochete. Their specificity is as yet unsettled. It is quite likely that they normally are symbiotic saprophytes, capable under certain conditions of causing pathologic changes.

4. The diagnosis of Vincent's disease from diphtheria and syphilis is simple. Smears from the lesions usually suffice.

5. Cases of uncomplicated Vincent's disease invariably give a negative Wassermann reaction.

6. The local application of concentrated solutions of arsphenamin is regarded as the best form of therapy. Most cases clear up within a few days.

7. Prophylaxis is better than cure. Oral sepsis is inexcusable.
Emil Mayer.

Cancer of the Oral Cavity, Jaws and Throat; Treatment by Electrothermic Methods or in Combination With Surgery, the Roentgen Ray and Radium, With an Analysis of Two Hundred Cases So Treated.

CLARK, WILLIAM L.

J. Am. M. Ass., Chicago, 1918—LXXI—1365.

The methods considered are electrodesiccation and electrocoagulation. The dessication method is one by means of which malignant growths of small or moderate size may be destroyed by the utilization of heat of just sufficient intensity to desiccate or dehydrate the tissues, and is produced by a monopolar high frequency current of the Oudin type, which is applied to the lesion by means of a steel needle or other pointed metallic applicator (usually steel knitting needles) which may be cut and curved, if necessary, to suit the case under treatment. The desiccation method is of advantage when the lesion is localized, and a good cosmetic result is to be desired, and is subject to such control as to area and depth that a very small growth, even on the cornea, may be successfully treated without injury to vision, as may a growth on the vocal cords be destroyed without impairing phonation. The very slight trauma and absence of secondary inflammation probably explains the absence of scarring and the success obtained in treating delicate structures.

Electrocoagulation is produced by a bipolar high frequency current of the d'Arsonval type, is more penetrating and intense in action than the desiccation method, and is utilized to destroy large growths, including those that involve bone.

When the antrum or other structures not easily accessible are involved, or when normal tissues cover the growths, operative surgery should be practiced as a preliminary to expose

the lesion or to extirpate the gross mass of malignant tissue, followed immediately by the electrothermic treatment to check hemorrhage and to reach malignant tissue not possible to reach by the scalpel or bone cutting instruments.

When involved cervical glands are to be removed, excision must be practiced, because it would be dangerous to work with the current near vital structures in the neck.

Two hundred cases were treated by one or both of the electrothermic methods or in combination with surgery, the roentgen ray and radium.

When the lesions recur only locally, there is a chance of success if the patient is treated a second or, indeed, a number of times; but if there is a recurrence in the glands of the neck, further treatment is usually of no avail.

The basal cell, or rodent ulcer type of epitheliomas occurring on cutaneous surfaces, even though advanced and with bone involvement, is so satisfactorily treated by the desiccation and coagulation methods that these lesions practically all recover when treated thoroughly.

The chances of success in cancer of the oral cavity vary with localization, the anatomic location and the presence or absence of glandular involvement.

The analysis of results obtained in 200 cases, and the illustrations, serve to give an idea of the rôle the desiccation and electrothermic coagulation methods can be expected to play in the treatment of cancer of the oral cavity, jaws and throat, and in which types of cases the use of operative surgery, the roentgen ray and radium in combination is justifiable.

Emil Mayer.

The Use of Heat and Radium in the Treatment of Cancer of the Jaws and Cheeks.

New, G. B.

J. Am. M. Ass., Chicago, 1918—LXXI—1360.

After the patient is anesthetized with ether, a mouth gag is inserted opposite the affected side. The tongue is drawn to one side out of the way, by the aid of a stomach clicker. The water cooled speculum is inserted, and all the teeth in the area involved or those that prevent good exposure of the growth are

removed. If it is possible, the entire growth is excised from the jaw or cheek, with a knife cautery, and the base is cauterized with soldering irons. If this is not possible, the irons are inserted into the tumor. The water cooled speculum prevents the burning of the lips or cheeks, except in the area being treated, and it affords good exposure. A wooden tongue depressor holds the tongue out of the way and prevents it from being burned. The cautery should be used longer than seems really necessary; at least for from twenty to forty-five minutes. If the growth is in the upper jaw and involves the antrum, the soldering irons are carried up into the antrum and the entire growth is gradually burned away.

Soldering irons are found to be the most satisfactory type of cautery, as the heating element in the handle of the electric cautery usually interferes with a good view of the area that is being treated. If the irons are too hot, the surface cauterized becomes carbonized and prevents the penetration of the heat. A slow heat that gradually cooks the tumor is preferable.

About two weeks after the cauterization, most of the slough will have cleared off, and radium may be applied directly into this open area. It is directed into the ulcerating area on lead applicators, using a 50 or 100 milligram tube within a silver tube, for from fifteen to twenty hours, without screening. If the growth has involved the antrum, the radium is placed in the antrum, packed there with petrolatum gauze, and left in place for the period of hours required by the particular type of lesion.

Of the twenty-one patients treated, twenty were traced; of these, fourteen have been free of local recurrence for from six to eighteen months. One patient recauterized three months previously, thus far has no recurrence. One died of lymphatic leukemia six months after operation; there was no recurrence. Two of the fourteen patients (one with epithelioma of the cheek and one with epithelioma of the upper jaw and cheek) have developed glands of the neck and have had block dissections. Thus twelve of the twenty patients have had no recurrence locally or in the glands for from six to eighteen months. One patient has a hopeless local recurrence. This patient was operated on before coming to the clinic. Two patients died of the cancer; one of these had been operated on before com-

ing to the clinic; one consulted a plaster doctor, and his present condition cannot be learned from his letter. There was no operative mortality.

The group of cases shows that the immediate results in the treatment of epithelioma of the jaws and cheeks without glandular involvement, by the use of the cautery and radium, have been very encouraging. The end results cannot be foreseen, but we believe that by the addition of radium to the treatment much more is being accomplished than formerly.

An Experimental Study of Parotitis.

WOLLSTEIN, MARTHA.

J. Am. M. Ass., Chicago, 1918—LXXI—639.

Three years ago material was obtained in the following way from a number of children acutely ill with parotitis: The patients were allowed to rinse the mouth with sterile physiologic sodium chlorid solution, and the washings were filtered through a new Berkefeld candle N. The resulting filtrates were proved sterile by aerobic and anaerobic culture methods and were injected into the parotid glands and testes of healthy, half grown cats. During the past winter the prevalence of parotitis in army camps near New York City provided the opportunity for repeating the work with material from adult (soldier) patients.

Results suggesting that protective substances may be developed by the cats after they have passed through a typical attack of experimental parotitis were obtained in two ways: 1. Animals were reinoculated from one to four months after the first inoculation and failed to develop the typical symptoms they had previously exhibited. 2. As was to be expected from the results of these reinoculation experiments, the serum from recovered cats had the power to reduce the development of the reaction caused by the injection of the virus of parotitis when left in contact with it at 37 C. for two hours. Animals inoculated with such a serum virus mixture failed to develop the typical symptoms or lesions produced by the virus alone or by virus treated with normal cat serum.

An interesting recurrent case occurred in a soldier. His first attack of mumps began in November, 1917, and he had three recurrences, the last one early in May, 1918. March

13th and again, May 1st, his filtered saliva was injected into a cat, with positive results. During the second recurrence, May 15th, the mouth secretions were found to be negative and the facial swelling of the parotid had disappeared. Jochmann says that the swelling of the parotid may remain for months or even a year. The lesion in this soldier lasted for a period of five and a half months, and his saliva was infectious for that period.

The writer summarizes: Cats injected into the parotid gland and testicle with a bacterial sterile filtrate of the salivary secretion of children and adults in the active stage of parotitis or mumps develop a pathologic condition resembling the condition present in mumps in human beings.

After an incubation stage of from five to eight days definite changes have been noted in the temperature, blood leucocytes and inoculated organs.

The rise of temperature and the leucocytosis precede the glandular swelling, but all the changes reach the maximum at about the same time, after which they decline, and normal conditions are reestablished in about four weeks.

The intraparotid and intratesticular injections of extracts of normal parotid gland and testicles may cause a mild rise of temperature and leucocytosis of brief duration, but swelling and tenderness are absent. The white cells increased are the polymorphonuclears and not the lymphocytes. The injection of filtrates of normal saliva causes only a mild and brief rise of temperature, but no leucocytosis or swelling of the glands.

The saliva of man and of inoculated cats, as well as the inoculated glands of the latter animals, were found to contain the filterable infective agent.

The virus of parotitis is most readily detected in the saliva during the first three days of the disease, less readily on the sixth day, and not at all after the ninth day. This would have a practical bearing on the question of infectivity and length of isolation period for mumps patients.

The virus was also detected in the blood of patients showing marked constitutional symptoms.

The serum of recovered cats was found to contain an immune body which diminished or even neutralized the action of the virus of parotitis.

Emil Mayer.

Simple Method for the Cure of Peritonsillar Abscess.

BILANCIONI, G.,

Policlin., Roma, 1918—XXV—413.

Peritonsillar abscesses are rather frequent among soldiers. Three or four attacks in a year are not uncommon. Considering the frequency of recurrence the author undertook to determine if the usual methods of operation were not responsible for the inadequate cure. The three methods in use at present are those of Lemaitre, Ruault and Killian.

The anatomic relations are of great importance. If we examined the anterior palatine arch (glossopalatine) we find a fold of mucous membrane which arises from its free margin and extends backward, passing in front of the tonsil which it partly covers. This fold, which is of great pathologic importance, has a triangular form (*plica triangularis* of His) and at its apex unites with the palatine arch. Its base disappears in the base of the tongue, while the free margin adheres closely to the body of the tonsil or extends for a variable distance above it, leaving the *interstitium interarcuatum* of His. Thus the tonsil is to a great extent surrounded by two folds which come from the anterior pillar, the *plica triangularis* in front and the *plica falciformis* above. At the upper portion of the tonsillar region, immediately behind the triangular fold, a curved probe may be inserted into a cavity which extends into the soft palate and which has important relations to the tonsil. In this space, the *supratonsillar fossa* of His, the pus from suppurating tonsils gathers. Some writers hold that in this inflammation the tonsil plays the primary, according to others the secondary rôle. His, Pater-son and others believe that peritonsillar abscesses originate in the *supratonsillar fossa* and in the palatine recess, but it is quite evident that primary phlegmonous tonsillitis is much more common than is generally assumed, but usually gives rise to only inconspicuous abscess or to moderate inflammation which changes to acute follicular or parenchymatous tonsillitis. Generally these benign cases escape the specialist and fall rather in the field of the general practitioner, since the symptoms are confined to enlargement of the tonsils, with scant exudation adhering and protruding from the crypts,

edema of the pillars and uvula, and dysphagia and sialorrhea with symptoms lasting four to five days. Suddenly some yellow fetid pus makes its way from the tonsil at some point difficult to notice and the patient feels relieved, and the tonsil is a little less voluminous. When the subjective disturbances are exaggerated, so that the patient can swallow neither solids nor liquids, suffers intense pain and almost suffocates, the fever being high, the neck rigid, there will be observed, if the mouth is opened and the tongue depressed, an enormous swelling in the region of the soft palate, located above the enlarged tonsil and projecting inward and downward. The uvula is intensely edematous and prolapsed. This condition lasts ten to twelve days if not operated upon. This form of angina, which is much more serious than the former, is nothing but an acute follicular tonsillitis which, instead of being localized at various points of the tonsillar body which may open outwardly destroying or perforating the parenchyma, is situated at the upper pole of the tonsil, which is usually well developed, with large crypts, true germ nests, which penetrate deep, at times more than one centimeter, into the interior of the supratonsillar fossa. If a sound is introduced between the uppermost part of the tonsil and the pillars, it will be found that the aperture through which the interior of the fossa is penetrated is often constricted by bands which favor the retention of tonsillar secretions in the cavity of the fossa. Not rarely the anterior and posterior margins adhere strongly to the respective pillars. The existence of these bands explains why the pus gathers all around the tonsil causing great suffering. The knowledge of these anatomic conditions also explains how an incision from the front, through the soft palate, is often insufficient, failing to reach or only partly emptying the sack behind the tonsil.

To give exit in this form of abscess and, above all, to prevent the relapses due to remains of cryptic tonsillar tissue in the fossa and imbedded in cicatrices, and which within a short time would give rise to a new abscess, the author proposes as a radical cure the extirpation of at least the upper half of the tonsil. Incising the body of the tonsil, the abscess is opened and emptied in toto so rapidly that in half an hour the patient is free from his sufferings. The lower portion

of the tonsil may be left in place without harm. There is, in fact, no subtonsillar fossa, as the tonsil at its lower pole is delicate and almost always attached to the neighboring tissues without projecting between the bases of the pillars and the base of the tongue, as is the case at the opposite pole.

—Survey of Head Surgery, Surgeon General's Office.

On Bone Grafting in Gunshot Injuries of the Mandible.

PLATT, H., CAMPION, G. G., AND RODWAY,
Lancet, London, 1918—CXCIV—461.

During the past two years more than five hundred cases of injuries of the lower jaw have been under treatment in the Second Western General Hospital. The operation of bone grafting has been performed on nine occasions, and has been advised but refused by the patient in at least an equal number of cases.

The writers found that two distinct types of fracture exist in which the autogenous bone graft can be used: (a) Where there has been a considerable loss of bony tissue with a resulting gap, and (b) where with comparatively close apposition of the fragments an unstable fibrous union has developed in spite of long continued fixation by splints. In the first class of case the bone graft fulfills the obvious mechanical function of restoring continuity; in the second class, where the osteogenetic capacity of the mandible in the immediate vicinity of the fracture has entirely disappeared, refreshing the bone ends is an absolute necessity if bony union is desired. In the course of any refreshing operation a small gap is inevitably produced, and this can be conveniently bridged by a graft which, in addition to its mechanical function, affords a potent stimulus to osteogenesis in the bed in which it is placed.

At the present time there are wide differences of opinion as to the source from which a bone graft should be taken. The authors then report in detail cases in which they have done bone transplantation. They have employed the rib, scapular and tibial grafts, and discuss the advantages and disadvantages in the use of these.

The tibial graft, removed with the twin saw, is the most accessible of all, and its use is sometimes agreed to by patients who object to the removal of a piece of rib.

With regard to the methods of fixation of a graft, the writers are confident that the avoidance of all foreign materials is an advantage. The bone flap method gives perfect fixation, and the careful suturing of the deeper parts of the wound in layers contributes an additional support.

Where it has been possible, the immobility has been maintained by splintage for some time after the operation in order to avoid strain on the graft.

Conclusions.—From such a small series of cases at the present stage no generalizations can be enunciated. The functional results in these cases have been such as to warrant the future employment of the operation of bone grafting in suitable cases. The exact technic can only be standardized after a study of the remote results in a larger series of operations. The double function of the graft, mechanical and physiologic, is well demonstrated in the series of radiograms accompanying the article. This series of bone graft operations is presented as a personal experience, without any comment on the contemporary literature, which is already voluminous.

—Survey of Head Surgery, Surgeon General's Office.

**Hemorrhage From an Aneurism of the Internal Carotid Artery,
Following Septic Sore Throat.**

RANSOHOFF, JOSEPH.

Ann. Surg., Phila., 1918—LXVIII—152.

Two cases are reported. Case 1 appeared in a boy of seventeen years who had had a peritonsillar septic inflammation of the throat which invaded the retropharyngeal lymphatics and caused an abscess. The temperature rose to 105°, with corresponding rapidity of pulse rate, and the abscess opened spontaneously, but the opening was later dilated with forceps. Although the condition progressed favorably, hemorrhage from the common carotid artery suddenly came on without warning and proved fatal in a very few minutes.

Case 2 was that of a girl sixteen years old who, previous to admission to the hospital suffered from a septic sore throat, with a white count of 14,000 to 20,000, attended with 75 per cent polymorphonuclears, 7 per cent small lymphocytes and 12 per cent large lymphocytes and 6 per cent mononuclears. Besides the condition within the throat there was a great deal

of swelling in the glands of the submaxillary triangle of the left side, which because of a matted condition indicated an extensive periadenitis. There was noticed at this time a very decided narrowing of the left palpebral fissure and of the left pupil, the very characteristic signs of pressure on the cervical sympathetic cord.

The abscess had been opened eight days before admission into the hospital, and temperature had subsided somewhat, but it continued irregular between 100 and 104 degrees, while the pulse rate varied from 122 to 130. Three days before admission there was a slight hemorrhage from the drainage opening in the pharynx, but this subsided spontaneously. This occurred with great severity on the day of admission. On examination it was found that the hemorrhage was due to an aneurism of the internal carotid artery. The examining finger detected in the posterolateral wall of the pharynx a swelling as large as a peach, elastic, distinctly pulsating and easily recognizable as an aneurism from which recurrent hemorrhage had come. The common carotid was tied at the point of election, but before the artery was ligated it was compressed for four or five minutes, the patient being permitted to come from under the influence of the anesthetic so as to determine, as far as possible, whether coma or paralysis would result from the ligation. Considerable dyspnea resulted from a hematoma in the larynx as a result of the operation and a tracheotomy was required. The patient made an uninterrupted recovery.

—Survey of Head Surgery, Surgeon General's Office.

Nasopharyngeal Conditions in Meningococcus Carriers.

CLEMINSON, F. J.

Brit. Med. J., 1918—II—51.

Application of antiseptic sprays to the nasal cavities has been the treatment mainly used to clear up carrier cases infected with the meningococcus of cerebrospinal meningitis. Wide variation in resistance to such treatment suggested that certain anatomic or pathologic factors must be the cause of this resistance. Cleminson's study is based on forty-seven cases. (1) *Pyorrhea alveolaris*. For normals the average index is 0.8. For carriers in general it is the same. But

in a group of carriers requiring prolonged treatment the index was 1.1. (2) Adenoids. Normals show 1.1, and all carriers 1.7. (3) Firm mucous contact. By this term Cleminson designates those conditions in which a thickened or deviated septum is in firm contact with one or both middle turbinates. Normals have an index of 1.5; all carriers 2.5, and those requiring prolonged treatment, 3.1. (4) Translucency of the maxillary antrum. Normals 1.5 of lessened translucency; carriers, 1.2. (5) Tonsils. Similar indices for normals and carriers.

Conclusions.—Factors favoring the genesis of carriers: (a) Adenoids; (b) the conditions implied in the term "firm mucous contact." Factors unfavorable to the genesis of carriers: Already existing septic infection of the sinuses. Factors favoring resistance to treatment: (a) Pyorrhea alveolaris; (b) firm mucous contact; (c) already existing septic infection of the sinuses.

—Survey of Head Surgery, Surgeon General's Office.

Simulation of Mumps.

TREMOLLIÈRES, F., AND CAUSSADE, L.
Presse méd., Paris, 1918—334.

This is accomplished by forcibly puffing out the cheek, closing the nostrils with the finger and striking the mouth with the hand. This forces air into the parotid region, which enlarges and resembles mumps.

—Survey of Head Surgery, Surgeon General's Office.

Report on Six Cases of Tonsillectomy in Diphtheria Carriers.

BALLANTYNE, C. C., AND CORNELL, B. S.
Brit. M. J., 1917—686.

Tonsillectomy by the snare method was done in six diphtheria carriers. Subsequent bacteriologic examination showed that the diphtheria bacilli had disappeared, usually with the healing of the wound.

Previously, living cultures of staphylococcus pyogenes albus had been sprayed over the tonsils, in the hope of outgrowing the diphtheria bacillus. Temporarily cultures showed only staphylococci, but within a day or two the diphtheria bacilli reappeared.

—Survey of Head Surgery, Surgeon General's Office.

Treatment of Wounds Involving the Mucous Membrane of the Mouth and Nose.

COLE, PERCIVAL P.

Lancet, London, 1918—CXCIV—11.

As a preliminary, the author restates his views, voiced previously on several occasions, as to the dental and surgical treatment of injuries involving the mouth and jaws, namely, that the principles and plan of treatment should be from the very first evolved by the combined efforts and pooled knowledge of the surgeon and dental surgeon concerned. Treatment of these injuries should be viewed as a whole, administration being undertaken by this individual or that, according to the lines along which the technical ability of the one or the other has been developed.

In the majority of cases a wound of the cheek involving the mucous membrane is complicated by fracture, more or less extensive, of the lower or upper jaw. The functional and cosmetic effect must both be considered, but it will be generally conceded that functional should precede merely cosmetic considerations. From the viewpoint of function the bony lesion is of more importance than the injury to the soft tissues, and its efficient treatment should consequently hold first place. Any method of treatment which ignores this cardinal fact cannot commend itself to our judgment. It is the writer's contention that the primary suture of these wounds cannot be considered a satisfactory procedure. Were the fracture dealt with adequately and simultaneously, all would be well. But it is not. To be of any service, primary suture apparently must be done early, more early than will allow of the preparation of an effective splint. If primary suture rendered the adaptation of a splint more easy, all would be well. But it does not. So far from this being the case, the insertion of any form of splint has, in some instances, been impossible without resort to surgical measures. The conviction has been forced upon the writer that primary suture of such wounds should never be undertaken when complicated by an associated fracture unless the fracture can be dealt with at the same time.

The method of primary suture being thus rejected, it is bet-

ter to wait until all sepsis has disappeared and the wound is soundly healed before undertaking the necessary operative measures. In the case of a cicatrizing wound threatening the movements of any particular joint, it is the surgeon's endeavor to maintain the joint in that position which will most effectually conserve the movement whose limitation is threatened. The movement, which will assuredly be either considerably limited or rendered totally impossible by cicatricial contraction occurring in a wound of the nature herein discussed, will be that of opening the mouth. It is logical as well as incumbent on the surgeon, and dental surgeon, to prevent such limitation by maintaining the jaws in a position of open bite. The necessary plastic operation was thereby reduced to a mere readjustment of the existing tissues. The surest way of maintaining the buccal sulcus is never to lose it. A policy of prevention as regards this important point would go far to render obsolete the many ingenious devices that have been evolved to deal with it.

Preliminary treatment completed, the patient is ready for operation. The type of operation best suited to this class of case is a matter in which individual opinions will no doubt differ. The writer suggests three basic considerations which determine behavior in this region: 1. The progressive tendency of an epithelialized flap to shrink. 2. For practical purposes the cheek may be regarded as consisting of two layers—an outer skin layer and an inner mucous membrane layer. The elasticity and distensibility of the cheek are dependent on the laxity and suppleness of both. Tension in one will vitiate function, however lax may be the other. Functional incapacity will be in direct ratio to the tension present in either layer. 3. The fundamental difference between real and potential loss of tissue. The real loss can best be estimated by a careful study of the wound immediately or soon after its infliction. As the wound heals, the additional factor of scar formation is introduced. The effect of radiating lines of scar tissue will be to limit the elasticity and flexibility of the surrounding tissues, and so render it impossible to obtain a satisfactory result by adopting the surgical measures applicable in the case of a freshly made, clean cut gap of equal extent. This cicatricial factor it is which more often than not renders

direct borrowing impracticable and makes necessary the introduction of new tissue.

The measure of new tissue necessary constitutes the potential or operative loss.

A consideration of these factors leads to the conclusion that the introduction of fresh tissue is frequently called for, and that the use of doubly epithelialized flaps is indicated. Skin flaps may be epithelialized on the mouth aspect by mucous membrane flaps. The author feels that it is futile to attempt to do what is usually known as "bringing the parts together" in the repair of these facial wounds. He describes in detail several of his cases in which plastic operation was performed, taking the grafts from the neck. The report shows the result in the treatment of two cases with lateral nasal deformities. The mucous membrane was replaced by a hinged skin flap from the cheek.

SUMMARY.

1. The result in any given case is largely determined by the initial treatment adopted.

2. The whole plan of treatment should be the joint evolution of surgeon and dentist working in concert to attain a common aim.

3. Open bite splints should invariably be used in the type of case considered.

4. The method known as bringing the parts together should frankly be recognized as unsatisfactory and be abandoned.

5. Skin is an admirable substitute for mucous membrane in that its texture is suitable and its extent unlimited.

6. Radiations may render the plastic surgeon such valuable assistance that facilitates for treatment by this method should be provided in the case of any jaw center or hospital.

—Survey of Head Surgery, Surgeon General's Office.

IV.—LARYNX, TRACHEA AND ESOPHAGUS.

Gunshot Wound of the Larynx, Phlegmon, Recurrent Paralysis.

COULET, G.

Rev. hebdomadaire de laryngologie, etc., Paris, 1917—XXXVIII—322.

A soldier, aged thirty years, was wounded by a bullet which entered near the anterior border of the right trapezius and emerged on the left side of the neck at the anterior border of

the sternocleidomastoid, on a level with the thyroid cartilage. On admission to the hospital, a day or so later, the patient had dysphagia, dyspnea, aphonia and sialorrhea. Pulse rapid, temperature 40° C. Marked swelling of the neck was present, and the larynx was displaced to the left. In some places there was gaseous crepitation. Every exploratory maneuver caused much pain. Laryngoscopic examination showed a large red tumefaction, evidently an abscess, occupying all the left half of the endolarynx, reaching from the epiglottis to the pyriform sinus. The right half was perfectly healthy and mobile. Treatment consisted of hot compresses and inhalations. The following day his temperature was gone, and his general condition was better. Laryngoscopy showed a diminution of the swelling, and pus was noted discharging into the pyriform sinus. Improvement continued and when the patient left the hospital all edema had disappeared, but recurrent paralysis was still present.

A. Miller.

Report of a Case of Foreign Body in Left Main Bronchus for Ten Years.

HUBBARD, THOMAS.

J. Am. M. Ass., Chicago, 1918—LXXI—1380.

Tracheotomy was indicated in this case to make easier the evacuation of the mucopus in the lung whereby the field was cleared and the foreign body properly grasped, and also as a protection to the operator. There was danger of losing the foreign body, or part of it, at the laryngeal isthmus, in which case it would probably have dropped back into the sound lung.

Perfect facilities for aspiration made ether narcosis safe, and in consideration of probable complications in extraction, such as necessity for turning, or a fibrous stricture of the bronchus, absence of tumultuous coughing was a factor in safety.

Without tracheotomy and direct aspiration of the accumulation of mucopus, general anesthesia would not have been safe, and by preliminary tracheotomy and repeated aspirations the anesthesia was made easy and the time very short.

The suspension method was considered; but here, again, the difficulty of preventing flooding of the sound lung made this impracticable.

Emil Mayer.

Temporary Loss of Voice Following Thyroidectomy.

GUTHRIE, DONALD.

J. Am. M. Ass., Chicago, 1918—LXXI—715.

The causes of temporary loss of voice may be put under four headings: (1) Trauma of the inferior recurrent laryngeal nerves; (2) trauma to the larynx and trachea; (3) syphilis, and (4) hysteria.

The anesthetist can give valuable suggestion to the subconscious mind during the early stage of anesthesia. Our nurses are trained to make all of our thyroid patients talk in their drunken ether state. They must be made to articulate some word. This is carefully noted on the chart, and should the patient lose her voice it is no source of anxiety to any of us. Occasionally it is impossible to get a patient to talk immediately after operation, and these are the patients who do worry us—but I know of no patient of mine who has had any permanent disturbance with speech.

The postoperative laryngoscopic examination is of importance, for if bilateral adductor paralysis alone is present it is surely due to hysteria. Most of the patients recover within from a few weeks to a few months with the proper kind of suggestion, but the rebellious case may worry the surgeon and startle a community for the time being. All forms of suggestion have been employed, from the mildest to the hypnotic. It is often necessary to treat the patient's family as well as the patient. We use repeated laryngoscopic examinations, with assurance, the battery, the therapeutic lamp, and gentle massage to the muscles of the neck. In the purely hysterical type there is complete restoration of the voice as soon as the patient can be convinced that she can talk. Judd tells of a patient who feared she would lose her voice after operation, which she did for months. She believed that if an adhesion was loosened in her neck her voice would return. She was anesthetized, the muscles of her neck were massaged. Her voice returned at once. Sistrunk had a patient who was given mild anesthesia and was merely assured while going to sleep that her voice would return. She talked as soon as she awakened. One of my rebellious patients had to be hypnotized twice. Another,

whose family could not be convinced that permanent damage had not been done, was made to relax the muscles of her throat, and take a deep inspiration with her mouth open. She made a loud crowing sound. Her mother who was present cried out, "Her voice has returned." She was able to talk at once.

Communications from different men doing thyroid surgery show an average of from 3 to 5 per cent of cases of temporary loss of voice, and from 20 to 50 per cent of huskiness and 3 per cent of temporary loss of voice since employing the methods herein described. This is a much smaller number than formerly when he did not carry out measures to safeguard the nerves and the trachea from trauma and did not consider hysteria as an element in producing the complication. These conclusions are based on a clinical study of 1,102 goiter patients, 619 of whom were operated on. Emil Mayer.

Esophageal Diverticula.

JUDD, E. S.

Surg., Gynec. and Obst., Chicago, 1918—XXVII—2.

In thirty-five cases in which operations were done in the Mayo Clinic there were two deaths. In each instance death occurred on the second day; both patients were very old and feeble. The cause of death in both instances was cardiac disorder. One died after the first of a two stage operation; one after excision of the sac and inversion of the base. In one of these, because of many general contraindications to operation, the patient was taught to pass a stomach tube, and for some months he lived by feeding himself in that manner; then the sac became so large that it produced a great deformity in the esophagus. The patient could no longer pass the tube, and an operation seemed imperative. The first stage of the operation was performed, but death took place suddenly the next morning. The history of the second patient is much the same, except that the sac was smaller and was removed at one operation. This patient also died the morning following the operation. In two of the remaining cases, there was some evidence of a recurrence of the diverticulum. One of these patients was entirely relieved by passing a sound a few times, and in

the other case it was necessary to reoperate for the recurrence. When heard from recently nearly all of the thirty-three patients were entirely free from symptoms. The writer believes that the infolding operation and the two stage operation are the procedures preferred and can be performed with practically no mortality. In operating on these cases, the approach was from the left side of the neck in all except one case, and that was from the right side. In six cases a transverse incision was made. One patient had been operated on for diverticulum one year before coming to the clinic. There was recurrence in one case. The patient began to have trouble about one month after operation, and was operated on nine months later by the two stage operation. This was the only recurrence in the series. The sac was excised and the base inverted and turned in in four cases. The Bevan operation was done in three cases. There were two deaths following operation, both on the second day. Both patients were known to be poor surgical risks; one a male, aged seventy-six years; the other a male, aged seventy-three years. Emil Mayer.

Warfare Injuries of the Larynx.

HARMER, W. D., London, *Lancet*, 1918—II—839.

The writer's statistics and conclusions are based on two hundred and forty-five collected cases. It has been noted that wounds of the larynx are infinitely rarer than wounds of the jaw; that the entry wound may be situated in any part of the neck and is generally smaller than the wound of exit; that the commonest place of entry is the anterior triangle of the neck, especially the region of the thyroid cartilage; that transverse wounds are more common than oblique; that injuries of the larynx between the level of the vocal cords and the cricoid are the most serious; that tracheal wounds are rare; that extralaryngeal wounds are very common, the air passages escaping by their mobility and the missile passing obliquely by the thyroid cartilage or transversely behind the larynx without penetrating its cavity. Out of 103 cases the wounds were caused by bullets in 58, shrapnel in 20, shell fragments in 16, bayonet 1, not stated 18.

In many of the cases examined the classical symptoms were remarkable by their absence, although the missile had undoubtedly perforated the air passages. Hemoptysis is common and may be severe. In general, the voice is immediately lost. Cough supervenes for a time. Dysphagia is common, but generally of a transient nature for a day or two. Dyspnea is variable and is often absent, even from severe wounds. It may, however, develop unexpectedly after apparently simple injuries and at almost any period.

In the early stages the first essential is to prevent the patient from choking, and even in all doubtful cases tracheotomy should be done. Cricotracheotomy is easy but inadvisable; high tracheotomy through the upper rings is less dangerous than a low operation. Free drainage of the wound of injury must be maintained, and foreign bodies removed in all possible cases. The later treatment should be carried out by laryngologists. Mortality is high, he states, but in 108 cases described in detail, there were only five deaths. In two-thirds of the gunshot injuries of the larynx that survive for more than a week, recovery is complete save for alteration of voice. In 108 cases the voice became normal in 17, strong hoarse, 24; weak hoarse, 12; falsetto, 1; whisper, 15; dumb, 1; not stated, 38.

—Survey of Head Surgery, Surgeon General's Office.

Contusion of the Larynx.

THOLLON AND LABERNADIE,

Rev. hebdomadaire de laryngologie, etc., Paris, 1918—XXXIX—317.

The authors have seen four cases of contused war wounds of the larynx. In each instance the projectile inflicted a glancing injury, producing a superficial wound without fracturing the cartilage. The patients stated that, at the moment, they felt the shock to the laryngeal region like a sharp blow which cut off respiration for a few seconds. Subsequently hoarseness was almost the only symptom. Radiography excluded the presence of any foreign body. Laryngoscopy showed in each case a bluish ecchymosis, varying in dimensions, but always localized to the periphery of the upper

larynx. There was no tenderness to pressure; no spontaneous pain. In one case, for example, there was a bluish ecchymosis with a submucous extravasation of blood, extending from the larynx to the velum palati and spreading into the right glossoepiglottic groove. The swollen ventricular bands almost concealed the vocal cords; the latter were slightly infiltrated. The laryngeal mucosa was reddened. In another case there was an ecchymosis in the left glossoepiglottic groove and a second lesion in the arytenoepiglottic region, with great edema of the left ventricular band.

Treatment comprised rest and insufflation of Lubet-Barbon's sedative powder (morphin). The ecchymoses disappeared about the twentieth day.

—Survey of Head Surgery, Surgeon General's Office.

Concerning Nerve Implantation in Recurrent Laryngeal Paralysis.

HOESSLY.

Beiträge klin. Chir., 1916—XCIX—186.

Hoessly, following the work of Erlacher and v. Hacker on direct nerve implantation into the muscle, severed the recurrent laryngeal nerve in three dogs and removed six centimeters from the nerve. A part of the spinal accessory was implanted into the laryngeal musculature. Laryngoscopic examination was done immediately after the operation and showed the vocal cord on the operated side to be in the cadaveric position. Five months later another laryngoscopic examination was done immediately after the operation and showed the vocal cord on the operated side to be in the cadaveric position. Five months later another laryngoscopic examination was made, and in one of the dogs there was still complete paralysis, whereas the other two showed normal vocal cords. The dogs were then killed. The last were stained according to the method of Bielschowsky and the former was imbedded in celloidin and stained with hemotxylin and eosin. In the two with normal vocal cords it was found that "new nerve fibers had grown into the musculature and in normal manner had come into contact with muscle fibers. Atrophic parts of the muscles were wanting."

—Survey of Head Surgery, Surgeon General's Office.

V.—MISCELLANEOUS.

Hypophyseal Tumors Through the Intradural Approach.

ADSON, A. W.

J. Am. M. Ass., Chicago, 1918—LXXI—721.

The technic herein described is of an intradural approach after an osteoplastic flap has been turned from the right frontoparietal region. The dura is opened widely to permit the exposure of the frontal lobe, which is protected with cotton and rubber tissue. The lobe is then elevated gently until the optic commissure and the hypophysis are exposed.

The operation is fully described with a report of six cases.

In two of the group of six cases, the patients presented very definite bitemporal hemianopsia, with more or less complete loss of vision in the left eye. One patient had a complete loss of vision in the right eye for a period of ten years, and a left temporal hemianopsia; one presented a typical acromegalic syndrome with a temporal color hemianopsia and constricted object field; one had bitemporal hemianopsia with more or less distorted fields in the left eye, and one had blindness in the right eye with definite neighborhood symptoms producing a frontal lobe syndrome of pressure and localization, involving the uncinate gyrus. Postoperative convalescence was uneventful and rapid in all but one case, in which the patient died on the second day. In two cases there was complete restoration of vision, in two marked improvement in vision, and in one a relief from headache. In the case of blindness in the right eye which was complete for ten years, the patient has begun to have a return of vision. The patient with acromegaly is having metabolic changes. In five cases there has been definite improvement. In one, no visual improvement, but relief from pain was obtained.

The particular advantages of the operation are: 1. Its approach presents a dry field, free from infection and in which it is comparatively easy to expose the optic commissure and the tumor. 2. The exposure permits the dissection of the tumor from the optic nerves and the commissure, and the removal of all or any portion of the tumor and pituitary body that is desired. 3. Trauma of the commissure and nerves

is prevented, as the sponging is done against the floor of the sella instead of working upward against the commissure and nerve peduncles. So far as the operative risk is concerned, it is no greater than in craniotomies on the frontal lobe, depending a great deal, no doubt, on the experience of the operator.

Emil Mayer.

Military Surgery of the Ear, Nose and Throat.

LOEB, H. W.

Medical War Manual No. 8, Authorized by the Secretary of War and under the Supervision of the Surgeon General and the Council of National Defense.

As the author states in his preface, this manual is a review of the surgical literature of the war in so far as it pertains to the ear, nose and throat. In addition, the writer gives at the beginning of each chapter a summary of the facts and opinions gained from his own experience and from the literature.

INJURIES OF THE EXTERNAL EAR.

Wounds of the Auricle.—The following injuries may be sustained: (1) Complete or partial detachment or destruction. (2) Wounds of various portions, with or without laceration. (3) Perforations by bullets or shell fragment. (4) Embedding of metallic or other foreign bodies in the auricle. (5) Burns and scalds. (6) Contusions.

The aim of treatment should be not only to promote repair but to prevent infection and perichondritis and to avoid deformity. The wound should be carefully cleansed, contused tissues cut away, foreign bodies removed and cut surfaces sutured when possible. Great pains should be taken to prevent perichondritis and to avoid stenosis of the meatus.

Wounds of the External Auditory Canal.—The canal is subject to injury in various degrees by projectiles. Obviously the bony canal is frequently involved by the injury, and important structures in the neighborhood may be damaged, such as the facial nerve, the large vessels and nerves in the upper neck, the brain, meninges, and middle ear. Hemorrhage from the

ear and pain upon movement of the temporomaxillary articulation are the two cardinal symptoms.

Fragments of metal and other extraneous substances should be removed; a postauricular incision and slitting of the membranous canal may be necessary to remove foreign bodies. The inferior maxilla should be immobilized if the osseous canal is fractured. The membranous canal should be dried out, boric acid applied and dry gauze inserted.

Stenosis and atresia are the chief distressing results and may be caused by adhesions, cicatricial fibrous masses, and hyperostosis. Treatment is by plastic operation and this sometimes necessitates a mastoid operation, either simple or radical.

INJURIES OF THE MIDDLE EAR.

Tympanic Membrane.—Lesions of the membrane are very common, sometimes directly resulting from projectiles, foreign bodies or caustics, but more often indirectly from the concussion of high explosives. Perforations may occur in any part of the tympanic membrane, but are usually in the inferior half. Symptoms may be entirely absent; hemorrhage is slight, deafness is usually transitory and a serous discharge may occur for a few days, but pain is seldom present.

Suppurative otitis media is the common result. An effort should be made to avert it by dry cleansing of the external auditory canal and avoiding irrigation of the ear.

Tympanic Cavity.—Here direct injuries are often associated with trauma of the labyrinth and injury of the petrous bone and cranial cavity.

Early treatment other than dry cleansing is largely negative, all washes and manipulations being interdicted. Nevertheless, infection and suppuration of the middle ear is the rule, and complications such as mastoiditis and sinusitis may follow.

Mastoid Process.—Injuries are mostly direct and compound, and may extensively involve the adjacent important structures. The chief danger is infection and resulting complications. Unless the wound is of the grazing type a mastoid operation will be necessary.

INJURIES OF THE INTERNAL EAR.

The internal ear may be injured in three ways, viz.: (1)

Direct traumatism; (2) traumatism by propagation; (3) indirect traumatism.

Direct Traumatism.—Injuries of the internal ear are usually a part of a larger process involving the middle ear, external auditory canal and mastoid process. Treatment is the same as that for other cranial wounds when important structures are involved—absolute rest and as little manipulation as possible except to remove foreign substances. Operative procedures will depend on the nature of the case.

Traumatism by Propagation.—This refers to those cases in which the missile does not come in contact with the bony structures of the internal ear, but in which they are involved by extension from injury of neighboring structures. Fractures of the petrous are special examples. These are most likely to occur in the region of the tympanum, the cochlea, the carotid and jugular fossa.

Treatment is largely expectant, and injections should be avoided, even after suppuration appears.

Indirect Traumatism.—This comprises an exceedingly large group of war accidents and includes those cases of indirect injury resulting from the detonation of shells and guns of large caliber. As to pathology, it is probable that hemorrhages occur in the labyrinth, accompanied in the most severe cases by contusion of the membranous labyrinth, which destroys the terminal sensory cells and which may be followed by atrophy of the neurons.

The more common symptoms are loss of consciousness, deafness of variable degree and permanence, vertigo, tinnitus of short duration, spontaneous nystagmus directed toward the sound or least affected side, briefly disturbed equilibrium, nausea and vomiting, altered voice and general hebetude.

Rest in bed is the cardinal indication; the diet should be restricted and iced applications or leeches should be applied over the mastoid.

Psychoneuroses of Hearing and Speech.—The number of these cases is legion; they come under the general phenomena of "shell shock." Deafness, deafmutism, mutism, stammering and aphonia are some of the types. No organic changes are found. Besides the dominant symptoms there may be various neurotic manifestations. Diagnosis offers little difficulty save

in differentiating from simulation or exaggeration. Prognosis is almost invariably good.

Treatment is by some form of suggestion and reeducation.

RECONSTRUCTION AND REEDUCATION.

Reconstruction.—The general subject of plastics is assigned to another department, and hence it is not included in this manual.

Reeducation of the Deaf.—The principle of all sensory reeducation is the reawakening of a sense by its specific physiologic stimulant. For the deaf, reeducation comprehends: Reeducation by voice, sound massage by vibrating plates, auricular and respiratory gymnastics, diathermia and lip reading. Types of deafness suitable for reeducation include labyrinth concussion, chronic suppurative or catarrhal otitis media in which deafness has been increased by war conditions, and deafness of psychoneurotic origin. Lip reading alone is of value in complete bilateral organic deafness.

Reeducation for Speech Defects.—Applicable in mutism, stammering, aphonia and altered speech. Respiratory reeducation is the fundamental requirement, and may be supplemented by holding the larynx in its proper position and systematic exercises for the lips, tongue and muscles of the face.

MISCELLANEOUS.

Facial Nerve.—The nerve is severed or lacerated or compressed by bone or foreign bodies. Treatment consists in removing foreign bodies or bone fragments, bringing cut ends of the nerve together with or without suture, implantation of other nerve fibers or anastomosis with other nerves (hypoglossal and spinal accessory).

NONTRAUMATIC AFFECTIONS OF THE EAR DUE TO WAR CONDITIONS.

From lack of cleanliness, lack of rest, exposure to cold, nervous tension, prevalence of infectious diseases and abnormal food conditions various diseases of the ear are perhaps more common than ordinarily.

Ear Defenders.—To prevent injury to the tympanum and labyrinth by concussion various types of ear defenders have

been devised, including cotton wads, diaphragm and ear plugs with a tortuous canal. The appliances at present used by the United States Army are the British Tommy (a hollow rubber nipple without any opening) and vaselized cotton.

INJURIES OF THE EXTERNAL NOSE AND NASAL CAVITIES.

External Nose.—Injuries comprise abrasions, contusions, slitlike wounds, penetrating or perforating wounds, detachment or destruction of part of all the external nose.

In the treatment of wounds of the external nose it is to be remembered that loss of tissue manifests itself by cosmetic deficiencies which may require plastic operation. Hence tissue should not be removed unnecessarily, and particles that can be saved should be properly sutured. If the nasal bones are depressed it may be possible to elevate them. Whatever is done, the patency of the nares should be preserved and stenosis avoided by using hollow splints or gauze packing.

Injuries of the Nasal Cavities.—These comprise wounds of • the septum, turbinates, floor and roof of the nose.

Hemorrhage should be arrested, foreign bodies and detached fragments of bone removed, and if the septum is fractured or displaced it should be replaced in proper position. Infection is the rule. Adhesions and stenosis are difficult to avert, but an effort should be made to prevent them by using hollow splints or gauze packing.

INJURIES OF THE ACCESSORY SINUSES.

These are associated, as a rule, with wounds of the nasal cavity and adjacent structures. The wound treatment comprises whatever is required for the accompanying wounds, removal of foreign bodies, etc. Infection and suppuration may be expected, and operation may be necessary. Intranasal operation in such cases is usually insufficient and external operation will most often be necessary.

INJURIES OF THE THROAT.

The sternomastoid, trapezius and the other cervical muscles are most frequently concerned. When severed the cut ends will unite in the majority of cases, but suture may be necessary. When any of the numerous great vessels in this region are implicated severe, often fatal, hemorrhage follows. Even

a small vessel in the pharynx or larynx may cause hemorrhage of serious moment. The nerves usually affected are the vagus, recurrent, spinal accessory, superior laryngeal and glossopharyngeal. Endoscopy and radiography are of immense service in examination. Secondary hemorrhage, infection and pneumonia are common complications.

INJURIES OF THE PHARYNX AND ESOPHAGUS.

Little treatment for pharyngeal wounds is required beyond that for the external wounds. If the wound is in the oropharynx or laryngopharynx, no food should be swallowed for a time and the patient should be fed with a stomach tube.

Notwithstanding its protected position, the esophagus is wounded far more than might be supposed. It may be contused or perforated, or it may lodge a projectile. Wounds of the middle and lower portions are always complicated by a chest wound and are usually fatal. When the esophagotracheal wall is involved, particles of food are likely to pass into the trachea and cause pneumonia. Stricture of the esophagus will result if there is any considerable laceration of its walls. Treatment of all esophageal wounds is largely expectant.

INJURIES OF THE LARYNX AND TRACHEA.

Larynx.—Wounds of the larynx are of consequence not only from the standpoint of the primary injury, but also of the stenosis which usually follows. Dyspnea, hemorrhage, aphonia, emphysema, dysphagia and cough are important symptoms. Complications include perichondritis, edema, stenosis and local paralysis.

Early careful treatment is necessary. As little as possible of the laryngeal structures should be removed. Hemorrhage must be checked and respiration must be maintained, the latter often necessitating tracheotomy. Sutures are inadvisable unless the wound be very large, as they are apt to break as a result of coughing, and closing the superficial wound increases the liability to emphysema.

Injuries of the Trachea.—Wounds of the trachea are obviously apt to be fatal. In some instances early tracheotomy or insertion of the tracheotomy tube directly into the tracheal wound may prevent a fatal issue.

PARALYSIS IN CONNECTION WITH WOUNDS OF THE THROAT.

The nerves which may be involved include the recurrent laryngeal, superior laryngeal, vagus, spinal accessory, glosso-pharyngeal, hypoglossal and sympathetic, each with its characteristic symptoms. The paralysis may be transient or permanent, depending on the nature of the injury.

STENOSIS OF THE LARYNX AND TRACHEA.

The lumen of the laryngotracheal tube may be narrowed by foreign bodies, acute inflammatory processes, deformity from perichondritis, bilateral abductor paralysis, webs, adhesions and cicatrices.

Various methods of treatment have been devised, including:

1. Removing webs, adhesions and obstructing tissue endoscopically. Dilatation may be combined with this.
3. Webs and adhesions may be removed after thyrotomy or cricothyrostomy.
3. Dilatation with Mackenzie's, Schoetter's or Levy's tubes or Thost's wedges is successful in some cases.
4. Laryngostomy and cricotracheostomy may be done for the purpose of dilatation.
5. Other methods are more radical and include permanent tracheotomy by attaching the trachea to the skin, and extensive plastic operations on the larynx and trachea.

OTHER CHAPTERS.

The remaining chapters deal with miscellaneous nose and throat conditions, malingering, the ear and aviation.

Bibliography appended is voluminous. Albert Miller.

The Protective Qualities of the Gauze Face Mask.

HALLER, DAVID A., AND COLWELL, RAYMOND C.

J. Am. M. Ass., Chicago, 1918—LXXI—1213.

The writers present their suggestions for masks:

1. It is their belief that gauze of the quality of Lakeside (24 by 20) or L and L (28 by 24) should be used in four layers, B and B (32 by 26) in three layers, provided all persons are masked. In case only the infected are masked, Lakeside

(24 by 20) should be seven layers thick, L and L (26 by 24) six layers, and B and B (32 by 26) five layers. If the masks of this thickness are used, the ambulances and receiving offices and particularly the clothing of uninfected patients would probably not become infected.

2. Masks should be eight inches in length, with the edges turned in and stitched. They should be five inches in width.

3. Two braids should be used, each one yard long, and sewed along the upper and lower borders of the mask so as to leave a free end fourteen inches long at each side.

4. The masks should be marked on the face side by a black thread tied in the gauze.

Emil Mayer.

Experimental Lesions of the Hypophysis.

CHIASSERINI, A.

Policlinico, Roma, 1918, XXV, sez. chir., 26, 44, 87, 97.

The author performed 38 experiments on dogs. The hypophysis was inoculated with the germs of sporotrichosis and tuberculosis. He sums up the results as follows:

By the inoculation of sporotrichotic and tubercular pathogenic material into the sella turcica and hypophysis he obtained various modifications in the structure of the glandular portion of the hypophysis. There were on the one hand retrogressive and inflammatory changes which gradually ended in a complete substitution of the hypophysis with a tissue of inflammatory infiltration; on the other hand, hyperplastic changes, more frequently at the expense of the pars intermedia except in one case where the pars anterior was affected. The former were obtained chiefly when the inoculation was made directly into the hypophysis or in the sella turcica after a previous mechanical lesion of the hypophysis; the latter prevailed in the cases in which the inoculation was made into the sella turcica without any lesion of the hypophysis. The anatomic lesions which result in a reduction or a complete disappearance of the glandular parenchyma produce a syndrome of cachexia or pituitary asthenia with a marked modification of character (a tendency to solitude, irascibility, somnolence), of posture of the body (crouching or defecating attitude), of gait (incoordination, pareticospastic gait), progressive loss of

flesh, fall of arterial pressure, hypothermia, terminal coma. This syndrome may also be observed in cases where considerable portions of the glandular lobes are preserved if the glandular secretion is prevented from entering the circulation by detachment of the peduncle, by numerous hemorrhagic foci or by stasis.

The hyperplastic changes of the pars intermedia apparently result in a polyuria which is sometimes very marked. Changes in the pars anterior may result in inspissations of the skin and osseous proliferations which resemble acromegalia. The syndrome of asthenia or hypophysial cachexia appears after a few days of complete well being and progresses rapidly. In some cases the syndrome was modified by the prevalence or the attenuation of one or the other symptom.

The increase of the volume of the hypophysis (two to three times the normal size) or the substitution by inflammatory tumefactions does not per se seem to cause special symptoms. Localized symptoms, too, observed in a few cases (disturbances of vision and of eye movements) are more the result of irritation and inflammatory infiltration along the nerve fibers than of a true compression. Usually the perihypophysial inflammatory infiltration is superficial. When it is deep and grave lesions are observed in the walls of the third ventricle, the symptomatology seems to be modified in the sense of a prevalence of spastic conditions. At all events, perihypophysial lesions, even serious ones, are compatible with life for a few days.

Two Cases Illustrating Plastic and Dental Treatment

GILLIES, H. D.

Lancet, London, 1917—CXCIH—850.

Case 1.—Reformation of the chin and lower lip by double pedicled bridge flaps and cartilage graft. This is shown by an attempt at restoration in that not uncommon class of gunshot wound of the jaw in which the whole body of the mandible and the soft overlying tissues have been blown away en masse. The author employs a double pedicled bridge flap from the scalp. By a bridge flap is meant one in which the pedicle lies over healthy skin, is divided from the grafted terminal portion after about ten days, and is then replaced into

its original position. The double bridge flap, though likely original, is merely the logical development of double pedicle embedded and single pedicle bridge flaps, and it combines the advantages of a double blood supply and of the provision of a flap well distant from the lesion.

The flap stretched from ear to ear across the vertex and was about three inches in width. Before bringing this into position the skin below the buccal opening was raised by incision and dissection and laid on the upper surface of a large osteocartilaginous graft from the seventh rib. This measured some six inches along its long convex border and was the shape of a boomerang; it included about one inch of the bony portion of the rib and was fixed by iron wire into the remains of the jaw, bone to bone on the left side, and cartilage to bone on the right, being fixed so that the point of maximum convexity of the cartilage became the prominence of the chin. The large scalp flap was then swung over the face into position so that it covered the upper, lower, and lateral aspects of the new "jaw," and sutured to the surrounding skin edges. The pedicles were cut on the eleventh day and returned to the scalp; the new blood supply of the grafted portion being satisfactory, there was no question of gangrene.

In planning this operation it was not expected that a good functional result would accrue, but some degree of mastication is yet possible where there was none, and the gain to the patient of having a chin and a full beard is almost certainly permanent. The secondary disability is a bare area on the top of the scalp, which is being epithelialized.

In criticising this procedure, the writer feels that it would be better either to insert a piece of metal or celluloid at the time the scalp flap is brought down, to be replaced later by an osteocartilaginous graft under more aseptic conditions, or else to embed the graft in two halves in the scalp some six weeks before it is swung down. In this event the graft, at a later stage, could be joined in the middle and to the remains of the jaw.

Case 2.—Restoration of the nose by dental splint and cartilage graft. The anterior part of the septum, with portions of both alæ, having been shot away, a considerable flattening of the nose resulted. The dental splint with a bridge on it

held the soft tissues of the nose up in place. He later inserted a piece of cartilage graft three inches in length, taken from the eighth rib. The cartilage was inserted in two portions through the columella; the longer portion was pushed in beneath the skin to form the bridge, while a shorter piece was embedded down the columella towards the maxilla so as to support the tip of the nose. Plastic resuture of the alæ to give symmetrical appearance was carried out at the same operation.

—Survey of Head Surgery, Surgeon General's Office.

Ear and Nose Manifestations of the Influenza Epidemic.

FETTEROLF, GEORGE.

Survey of Head Surgery, Surgeon General's Office,
1918—I—199.

The epidemic, as far as the upper air passages are concerned, has had several notable features.

1. The large number of serous or serosanguineous blebs, the so-called otitis externa hemorrhagia, which developed in the external canal. At first we opened these, but later we adopted the plan of not touching them unless they interfered seriously with a view of or drainage through the tympanic membrane. A curious and unexpected feature is that they were as sensitive to the knife as is the ear drum.

2. The large number of cases of middle ear inflammation without serious mastoid involvement. Since the onset of the epidemic we have incised about 150 ear drums and have seen at least that many more which have not needed incision. Possibly some were incised which did not need it, as we made it a rule to cut in all doubtful cases. But we feel sure that none which did need an incision failed to have one. At any rate, we have yet to see a real mastoid case. There has been a number of tender mastoids, but these all have resolved or are resolving without operation. To me, the selective affinity of the infecting organisms, in not invading destructively the mastoid cells, is quite noteworthy. Every case of middle ear pain in our Base Hospital has been promptly attended to, but even this could not adequately explain this remarkable escape of the mastoid from serious disease. Unfortunately,

no bacteriologic work on our cases has been possible. The laboratory was badly handicapped by sickness among the personnel, and only the more imperative work could be done.

3. The paranasal sinuses also seem to have escaped trouble. Of course, in the rush we have had, it is possible that cases of headache have not been ascribed by the Ward Surgeons to the proper source, but I feel that if the incidence of sinusitis had been at all great the attention of our Department would have been called to at least some of the cases.

4. Epistaxis. The frequency of epistaxis in the first 2000 cases I am inclined to ascribe to the train dirt to which they were exposed for two days.

Gauze Mask in the Prophylaxis of Contagious Diseases.

BERNARD, A.

Progrès méd., Paris, 1918—XXIII—175.

Gowns do not protect from infection with contagious diseases. The germs are exhaled into the air and are inhaled by the attendant. Wearing a gauze mask seems to be very protective. From June, 1916, to December, 1917, not one of 173 nurses in the scarlet fever wards were infected, though there had been nine cases in the three years previous.

—Survey of Head Surgery, Surgeon General's Office.

Treatment of Facial Cicatrices.

POULARD, A.

Presse méd., Paris, 1918—XXVI—221.

Total ablation is suitable only for superficial and projecting scars; it is a bad method for deep ones, adhering to the bone, where it may lead to serious complications, such as reawakening a dormant infection. Also, sometimes the scar closes an opening into the facial or the cranial cavity, and it is dangerous to reestablish such an opening. As a substitute for total removal of these scars, the author has used the following method of operating:

(a) A deep incision is made all around the scar, well 'out in the healthy tissue.

(b) Then he dissects out the superficial, epidermized layer

which covers the outlined scar island. But only the most superficial layer should be removed, leaving in place the underlying cicatricial mass.

(c) Finally the healthy lips of the wound are rendered freely movable and are sutured over a thick mass of adipose tissue, which is placed over the cicatricial mass left behind.

—Survey of Head Surgery, Surgeon General's Office.

A Report on the Influenza Epidemic of 1918.

GOTCH, O. H., AND WHITTINGHAM, H. E.

Brit. Med. J., 1918—II—82.

The report is based on the first fifty cases occurring among the Royal Air Force at Hampstead Hospital. Etiology: Specific cause appears to be a gram negative micrococcus, perhaps in association with bacillus influenza, the latter being isolated in only eight per cent of the cases.

Incubation period, one to two days. Duration, three to five days, the five day type being more severe.

Chief symptoms: Sudden onset of malaise, body pains, headache, anorexia, constipation, cough, photophobia. Chief physical signs: High temperature, maximum on second day; tongue heavily coated; acute pharyngitis, stomatitis, gingivitis, conjunctivitis, albuminuria with hyaline and granula casts. Blood counts show leucopenia with relative neutrophilia at the height of the fever.

Treatment: Rest in bed; free movement of bowels; aspirin, grains ten, t. i. d. until temperature is normal; light diet.

—Survey of Head Surgery, Surgeon General's Office.

SOCIETY PROCEEDINGS.

ABSTRACT OF PROCEEDINGS OF THE TWENTY- FOURTH ANNUAL MEETING OF THE AMERI- CAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, ATLANTIC CITY, MAY 29 AND 30, 1918.

JOINT MEETING OF THE AMERICAN LARYNGOLOGICAL ASSOCIA- TION AND THE LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY.

Symposium Upon Bronchoscopy.*

REGULAR SESSION.

Localization of the Lobes of the Lungs by Means of Transparent Films.

CHEVALIER JACKSON, M. D.,

PHILADELPHIA.

For mapping out the outlines of the lobes of the lungs in a radiographic negative, the overlaying of the plate with a transparent positive outline film is very useful. It is necessary to have about twelve sizes of outline films of each of four points of view, front, back, right lateral and left lateral. These, with a moderate mental endowment of solid geometry will be of great help in localizing the outlines of the confusingly irregular lobar shapes.

Conditions Developing in Chronic Suppurative Otitis Media Which Should Constitute the Basis for Exemption From Military Service.

EDWARD B. DENCH, M. D.,

NEW YORK.

The writer classified the symptoms of chronic suppurative otitis media as those where there is a constant profuse discharge, a constant slight discharge, an intermittent discharge.

*See page 1140 to 1154, September Annals.

and where, in spite of the condition, the patient states that there is no discharge. From a military point of view, cases suffering from a constant profuse discharge should naturally be rejected for general military service, but not necessarily for limited service. In view of the fact that the quantity of the discharge gives very little idea as to the real danger to the patient, other symptoms, such as occasional attacks of vertigo and persistent headache, should lead to rejection for general military service in any case of purulent otitis media. Intermittent discharge from the ear does not disqualify for limited military service, and, in many instances, general military service is not attended with danger to the government or the patient.

All cases of middle ear suppuration are classified under six heads, according to the perforation: (1) Cases of small central perforation. The condition is seldom serious and is usually relieved by local treatment. (2) Large kidney-shaped perforation, without caries of the ossicles, and with mucous membrane of middle ear, dry or moist. Where the mucous membrane is dry and dermatized the patient is perfectly fit for military duty, provided the hearing comes up to the standard prescribed by the Government. (3) Large kidney shaped perforation with the presence of granulation tissue. These cases always have profuse discharge. The patients should be kept under observation, in a hospital, the granulation tissue removed, and the ear kept clean by irrigation. If, at the end of two weeks, the ears become dry or if there is only a slight discharge, the patients may be accepted for general or limited military service, depending upon the degree of hearing. (4) Perforation in the upper posterior portion of the membrana tympani, with a sinus leading into the tympanic vault, the lower margin of the membrane adherent to the tympanic wall, while the epithelium of the drum membrane spreads over the internal tympanic wall. These cases are prone to develop intracranial symptoms, and should not be accepted for general military service unless reconstruction is made, that is, unless the case is subjected to the radical operation. (5) Complete destruction of the drum membrane, with sinuses leading in front and behind the short process of the malleus into the tympanic vault. If these cases are dry they should be accepted

for general military service, provided the hearing is adequate to pass the test. With even a slight discharge, however, these cases should be rejected for general military service unless reconstruction is permitted. (6) Small perforation through the membrana flaccida, without the presence of granulation tissue. This condition is always indicative of intratympanic caries, and such a registrant should not be accepted for military service without reconstruction. This applies to all cases whether the discharge is constant, intermittent, profuse, or scanty.

Little importance is attached to the character of the discharge, whether seromucous, mucopurulent, or purulent.

The presence of labyrinthine symptoms in any case of suppurative otitis constitutes a basis for exemption. This would apply to all cases excepting those in which there was total deafness, a dead labyrinth, a dry ear, and in which the rotation test showed that compensation had completely taken place. A total deafness on one side would, according to the present rule, exempt the patient except for limited military service, and for this service he would certainly be competent.

The reconstruction of all cases of suppurative otitis media by radical operation in cases otherwise fit for military service is strongly urged. The same applies to cases in which labyrinthine symptoms exist. In cases of double suppurative otitis media the question of reconstruction is graver. The operation should be performed first upon the poorer ear, and, if this is successful, the other ear should be operated upon, thus rendering the patient fit at least for limited military service. The essayist was inclined to think the ordinary Base Hospital does not offer the ideal surroundings for these reconstruction cases. The Government could well make use of a large number of public institutions scattered throughout the country for this purpose.

DISCUSSION.

DR. TALBOT R. CHAMBERS, Jersey City, corroborated Dr. Dench's remarks. He recalled a meeting, a few months ago, at the New York Academy of Medicine, when a number of men reported having done the radical operation, some with primary graft. All agreed that the hearing was as good or

better than before operation in the majority of cases. A man with hearing of 20/20 in one ear and 5/20 in the other might be fit for the front line, but according to the regulations he would have to be rejected. It was just the same as with 20/20 vision in one eye and the vision of the other impaired. Such a man could go into service, but the regulations would not permit it. He thought many men had been thrown out on the first draft who would go in on the second.

DR. JOSEPH C. BECK, Chicago, had had considerable experience with one of the advisory boards in Chicago, and, as Dr. Chambers had said, it seemed a pity, in many instances, that a man otherwise healthy was thrown out because of slight impaired hearing, many of them being not only fit but anxious to go. Many of them were willing to go into a hospital for a radical operation, but the after treatment was so tedious that it would be a long time before they could go into service. At Camp Grant a number of men had been discharged on account of tubal secretion into the middle ear after an otherwise radically operated mastoid. In six cases he had been able to make the men fit for service by subsequent closure of the orifice of the eustachian tube. This was done by removing the mucous membrane both at the pharynx and in the middle ear, thus making a dry ear out of a discharging ear. The type of perforation had been clearly shown by Dr. Dench, and if the Advisory Boards received new orders along these lines a great many men would pass for limited service who had heretofore been rejected.

DR. WALTER B. JOHNSON, Paterson, said there was no commanding officer in his section, these cases being left to the general board. Ten feet with both ears was very poor hearing for a man who is to be under command in a noise. If one ear was 20/20 and the other was suppurating, the man could not be admitted. He had not found many men around Paterson who wanted to get out of service, and very few malingerers, as reported by Dr. Day; on the other hand, most of them were anxious to go. It seemed too bad that a man who had lost the vision of one eye but who had good vision in the other should be refused. He should be accepted for special service. The same applied to the hearing in nonsuppurating cases. As to the radical mastoid operation, many cases operated upon by

this method were not dry and never do get dry, and in such cases the regulations forbid their acceptance for service. A larger number of men should be drafted so that those who are physically fit could be selected. We must prepare for the organization of an overwhelming force over there, and to win the war we must have soldiers who can stand the pressure to the end.

DR. HENRY L. SWAIN, New Haven, thought both sides of the question very well presented. Dr. Dench had emphasized the view that men are able to serve even though they have some moisture and some damage to the drum, while Dr. Day had shown the probability of pension claims resulting from suppuration and its sequelae. The speaker took no chances, and, as a member of an advisory board, rejected all purulent cases unless dry for a long period. Once in a while it might be necessary, in the cantonments, to settle the question by operating, but this was not desirable.

DR. S. MACCUEN SMITH, Philadelphia, had found many more cases of intracranial complications in the intermittent than in the continuous type. He considered it quite obviously true that the presence of a brownish yellow, foul smelling discharge indicated a more or less extensive bone necrosis.

DR. CHARLES W. RICHARDSON, Washington, agreed, in the main, with Dr. Day. He was a member of the Board which considered the examination of registrants and the preparation of the new set of rules for examination. He had insisted on the absolute exclusion of all suppurative conditions, all chronic suppurating ears, even though dry, and even for limited military service, for the reason that conditions are different in civil and military life. The experience of the British had been that if a man was inducted into service with suppurating ears he not only become unfit for service, but he became a source of danger to himself. It was unjust, therefore, to subject such a man to the casualties of warfare and to the dangers of disease which might cause his death as a result of exposure. But why create in the Surgeon General's office a machinery for the correction of these defects? Why not have the defects corrected in civil life? It was all right, perhaps, for Dr. Dench and those who did a supreme radical operation to hold that these men should be reconstructed, but even Dr. Dench and

others of like experience did not always get dry ears with the radical operation. Furthermore, if the man were reconstructed in the army it meant inactivity for three, four, or six months on the part of the man. And why, when physically perfect men are demanded, should the army be encumbered with men who require from four to six months to be in physical condition to be of service?

DR. CHRISTIAN R. HOLMES, Cincinnati, had given considerable thought to this subject since entering Camp Sherman last fall. He agreed with Dr. Richardson. It was a most serious proposition. When he first began to treat these cases, he asked the Division Surgeon to define the class that should be rejected. The reply was: "I cannot tell you. The Government's requirements are so difficult that it is up to you as an expert." He tried it, but the men had not been in the service more than a few weeks until, under the exposure incident to the training, they were back again. He was not convinced that only those should be accepted that were healed, or those in the first stage.

DR. ARTHUR I. WEIL, New Orleans, had had some experience in examining board work both before and after entering the service. In the examination of the first draft the instructions were to reject men with suppurating ears, and to exempt those who showed perforation of the drum membrane. Of course, at that time men were exempted more readily than now. After some experience in the cantonment he was convinced that the original plan was best, and that these men, now accepted, but formerly rejected, would have trouble when they get into active service. No man with an unhealed suppuration was a proper one to be sent abroad. He did not agree that the base hospital was the proper place for the radical mastoid operation. It might be advisable, as had been suggested, to persuade these men to go to civil hospitals as candidates for limited military service.

DR. A. P. VOISLAWSKY, New York, had been on the St. Luke's Hospital advisory board for a number of months, and of the men rejected for chronic suppurative otitis, not one had been induced to enter a hospital for a radical operation in spite of all the persuasive powers at his command.

DR. WELLS P. EAGLETON, Newark, wished to correct an im-

pression that seemed to obtain with reference to base hospital facilities for mastoid operations. Dr. Dench, Dr. Day, Dr. Richardson and others had expressed the opinion that these cases should be operated outside. He emphasized the fact that his experience had been that these cases heal more quickly and with better results than he had seen outside. The Government had put at the command of the operator men who could do bacteriological work or anything that might be required in a given case. Before he went into service he had had a very vague idea of the Carrel-Dakin method, because in hospitals it was used by internes and nurses, but with the organization made possible by the Government the use of the Carrel-Dakin solution in mastoid operations had become the routine treatment. Better results could be obtained with this operation in a military hospital than in a civil hospital.

Tests For Malingering in Defective Hearing.

PHILIP D. KERRISON, M. D.,

NEW YORK.

The essayist limited the discussion to the application of the tests for malingering. It is quite important, in dealing with suspected malingerers, to give not the slightest hint that they are in any way under suspicion. The more unsuspecting and credulous the examiner may appear, the more readily and conclusively will the examined respond to the tests. The most glaring evidence of deception should therefore pass without comment or apparent notice until the examination is completed.

Most malingerers of deafness who are subject to the military draft know that deafness of a certain grade in either ear will exempt them. Complete bilateral deafness, therefore, for various and obvious reasons, is rarely claimed. Two types of unilateral deafness are assumed: (1) Deafness advanced but not complete; (2) absolute deafness.

The tests upon the combined results of which the essayist has usually been able to base a definite conclusion are: (1) Weber's test; (2) the loud conversational voice test; (3) the binaural stethoscope test; (4) tests eliciting incongruous varia-

tions in response; (5) the noise apparatus-reading test (Lombard's test).

The method of examination employed is about as follows: Only one registrant at a time is admitted to the room. It is learned from him which ear is the deaf or deafer one, and whether he regards this deafness as partial or complete. If only one ear is complained of, a rapid test is made of the hearing of the better ear to determine that it is functionally sound or at least only slightly subnormal. This preliminary testing of the sound ear is essential to a proper interpretation of tests to be applied later. The tests are then applied in the sequence named above. If, with the Weber test, when the vibrating tuning fork of 256 double vibrations applied to the vertex of the skull, the sound is referred to the good ear, the examiner becomes skeptical and proceeds to the loud voice test. The registrant's eyes are blindfolded, he is requested to close with a finger the better ear, which has already been determined to be approximately sound functionally, and words and numbers are repeated, at first in a low voice and then in progressively louder tones. If, when a pitch and intensity have been reached at which he should be able to hear, he still states that he cannot, he is then known to be an intentional malingerer. He may claim, however, that he hears the sound through his occluded normal ear. The stethoscope test is then applied. One earpiece of an ordinary clinical stethoscope is completely occluded with wax. Standing behind the registrant, the stethoscope is adjusted, with the occluded earpiece in the "deaf" ear. After speaking in a low whisper into the funnel shaped chestpiece, the stethoscope is removed for the ostensible purpose of trying some other test, and then replaced, the occluded earpiece in the sound ear. If he hears approximately as well as before it is assumed that deafness is either assumed or grossly exaggerated. This is a fairly reliable test. In tests for eliciting contradictory responses the registrant's eyes are uncovered, the better ear is closed with a finger, and the "deaf" ear is subjected rapidly to the commoner classical tests, his responses being carefully noted. He is then blindfolded again and the same tests repeated many times, fairly rapidly and in varying order. The responses will almost surely demonstrate, in malingerers, incongruous and contradictory variations.

Lombard's test is one of the most dependable means of determining absolute or very advanced unilateral deafness. It requires a Bárány noise apparatus, and depends upon the fact that to the normal individual the sound of his own voice is necessary to the proper regulation of its tone and intensity. The man profoundly deaf, when told to read aloud in a natural voice and to continue to do so after the noise apparatus has been started, will continue to read in an even tone or in a tone only slightly elevated, whereas the malingerer will at once raise his voice or literally shout. This is a test which a malingerer who has been coached may easily turn to his advantage. Otherwise it is one of the most useful.

With a quiet room and sufficient time, there are few malingerers who will be able to deceive a careful and experienced examiner.

DR. WILLIAM B. CHAMBERLIN, Cleveland, had successfully employed the two-fork test, using two forks of the same pitch, making one with a louder tone vibrate before one ear, when the louder vibration would obscure the softer, held before the other ear. The ordinary cotton plug was fairly useful. When the vibrating tuning fork was placed on the vertex of the skull (Weber test), the individual had a preconceived notion, and although he would not try to deceive he would involuntarily say that he could not hear the vibrating tuning fork in the bad ear and that he could hear it in the good ear.

DR. KERRISON, in closing the discussion, was interested to hear the different experiences with reference to the frequency of malingering in the different localities. In New York there were a great many malingerers. The tests he had reported were the ones used there. It has not been found necessary to resort to abusive measures or threats. Apropos of Dr. Day's experience, he recalled a case related by Dr. Lewis Coffin of New York, in which a man claimed extreme bilateral deafness. After most extensive tests the examiner was still in doubt as to the truth of the registrant's statements. He was sent out, and an orderly, trained for the purpose, went out with him, offered him a cigarette, and said to him, "How did you come out?" "Oh, I put it all over him!" replied the registrant.

Types of Mastoid Structure With Special Reference to Their Differentiation by Means of Stereoradiography.

F. N. BIGELOW, M. D.,

PROVIDENCE.

After reviewing the published opinions of others, the writer cited twelve cases, with illustrations. Before the advent of mastoid radiography there was no means by which the structure of a mastoid could be accurately determined previous to operation; consequently the mastoid structure received little or no consideration as a clinical factor. While it is true that the size and shape of the mastoid may give some clue as to the underlying anatomy, experience has proved that for the most part this is the merest guesswork. To determine previous to operation the size, distribution and approximate number of mastoid cells and the location of the sinus, the radiogram is the *sine qua non*.

The usual classification of mastoids into types according to cell structure (pneumatic and diploetic) is useful for clinical study and comparison only when it is made more descriptive and sufficiently comprehensive to include such other variable factors of mastoid structure as have clinical significance. Among these are the thickness and density of cortex and cell partitions, the number, distribution and arrangement of cells, and the location of the sinus. Both the diploetic and the pneumatic mastoid may be divided into three distinct anatomic types, each having both clinical and surgical significance peculiar to itself. The classification as given by Cheatle (infantile, diploetic, dense, mixed infantile and pneumatic with the infantile characteristics predominating) is accepted by the essayist, and illustrative cases are presented, with stereoscopic pictures giving the variations in structure. Possible variations of these types are discussed. Emphasis is laid upon the necessity of securing radiograms of good technical quality. The technic employed is detailed. The advantages of stereoscopic study of the mastoid are those which accrue to stereoradiography in general, and which have caused the marked increase in

the use of stereoscopic rather than flat plates wherever practicable.

An estimation of the technical quality of plates of the mastoid region is of extreme importance. When some or all of the mastoid cells are pneumatic, the character of the cell detail will furnish an index of plate quality. In a good plate normal cells should be definitely black, with sharp and clean-cut walls. If there is any generalized diseased process, other portions of the plate must be considered in judging quality. The temporomandibular joint, the auditory canal, and the lateral sinus are all regions that must be studied. They should be sharp and clear cut in a properly exposed and developed plate. The bone of the mandible should show its structure well defined. In addition, the character of the detail of the skull generally and of the sutures is of value. The ability to judge these points is of especial importance when examining stereoscopic plates, as then at least four plates are developed separately. A complete radiographic examination of the mastoid consists of a set of stereoscopic plates of each mastoid in the lateral oblique diameter, and one exposure of each mastoid in the anteroposterior diameter. A roentgen examination of this character and quality will in most instances reveal the type of mastoid, and this information should enable the observer to predict the clinical course and the prognosis of a middle ear infection with greater exactness, and to place therapeutic measures on a more scientific and less empiric basis.

Ear Protectors.

CHARLES W. RICHARDSON, M. D.,

WASHINGTON.

The Otolaryngologic Section of the Division of Surgery of the Head of the Surgeon General's Office, coöperating with the Research Committee of the Council of National Defense, with Surgeon G. E. Tribble of the Navy, and with Dr. Stacey Guild of the University of Michigan, undertook a series of experiments which have resulted in the finding

of a fairly serviceable protector that filled all the requirements as nearly as possible.

The conclusions drawn from these investigations are summarized, in part, as follows:

There is the immediate incapacity of the affected men for service, for a shorter or longer period, some of whom must be discharged.

As all men who are subject to injury of the auditory apparatus require medical attention, the time of medical officers, nurses and equipment could be available for other purposes.

The more severe cases result in permanent deafness, which, besides being a great handicap, impairs the soldier's later social and industrial life.

The subject of pension and compensation becomes an immediate financial consideration.

The causes of injuries may be divided into two different groups:

First.—Those which are due to a single detonation, or continued single detonations, such as artillery fire; and,

Second.—Those which are due to continuous sounds such as concussion of the air as produced by massed artillery and trench mortars and machine guns.

The character of the injury may be divided into three different groups:

First.—Rupture of the membrana tympani and other injuries of the conductive apparatus.

Second.—Those caused by organic injury from slight to complete destruction of the labyrinth.

Third.—A large number of cases which do not belong to either of these groups but in which both may be factors; functional disorders, most frequently of the central nervous system.

It has been the object of the Section of Otolaryngology to make a thorough and careful investigation of the various forms of devices that have been invented for the purpose of lessening these various disturbances. All of these have one single object: the lessening of the severity of the concussion impact, either of the single or continuous type, at its receptive point, the conducting apparatus of the ear. These

devices have as their primary conception that the injury produced by air concussion from detonation is transmitted through the conducting apparatus. All of them have the mechanical idea of lessening this condition by shutting off in various ways the force of the air concussion, and yet permitting sound waves to reach the membrana tympani so that the soldier may be protected yet hear. "Necessarily most of these appliances diminish to a certain extent the hearing power. These mechanical devices have been tested on the living animal; have been tested physically to show how much each one permits the passage of the force of air concussion to the membrana tympani, and also rather imperfectly on the human subject, at such stations as Indian Head and the Navy Yard at Washington.

It is scarcely necessary to go into detail as to the various types of experimentation and the lines along which they are carried out. The simple results are presented, as follows:

There are three important features in the device: First, applicability; second, safety; third, cheapness.

All types of hard and metallic forms of protectors are dangerous, because in cases of gunshot wounds, shrapnel wounds about the auricle or canal, they are likely to become secondary foreign bodies. Therefore, mechanical devices can be eliminated, such as the Wilson-Michaelson and Mallock-Armstrong. Some of the cheapest, while fairly good protectors, should be ruled out, because they cut off the conduction of air sounds too greatly.

There is no question, through all the experimentation, that one actual protector has been found, that known as the "British Tommy," manufactured by George F. Berry, 4 Cullum St., Penchurch St., London, E. C. The device is simple, easy to introduce, causes no undue pressure, and is easy to remove. While it cuts down the hearing, it does not reduce it sufficiently to impair the voice beyond military needs. It prevents impact of concussion upon the membrana tympani, the conducting apparatus; it is safe; there is no possibility of forcing it in against the membrana tympani; it is not likely to be any more conducive to secondary foreign bodies than anything that could be worn in

the war, and it is comparatively cheap. Attached is a copy of contract which Mr. Berry was willing to make with this Government. In all the tests, as will be observed in the charts and exhibits accompanying this paper, it has proved itself the best protector. Actual experience upon the living has been impossible at this station, because of inability to procure the protectors. The one set transmitted with this communication is the only pair on hand. The cost is about one shilling a pair. They can be procured in London and furnished to our troops on the western front.

The next most satisfactory device is the Mallock-Armstrong, made by the Mallock-Armstrong Defender Company, 2 Palmer St., Westminster, London, S. W.

The only objection to the Mallock-Armstrong is that it is made of hard rubber and is apt to become a secondary point of foreign body injury. In other respects it is nearly as good as the "Tommy." It is not as easily introduced as the latter.

The next device to be presented is the Baum. This is very simple, very easily introduced into the ear, but not so easily removed. It can be worn for longer or shorter periods without causing any inconvenience to the patient. It is light in weight, and there are practically no dangers attendant upon its use as regards secondary foreign bodies. It is not nearly as good, however, as the other two previously mentioned. It does not give the fine degree of prevention as do the others to concussion impact, but it is an American invention and can be bought at a very reasonable price.

Reference should be made, before closing, to the Wilson-Michaelson device, which is planned somewhat on the type of the Mallock-Armstrong. It has a movable valve, which has been demonstrated under experimentation not to move as freely as it should under detonation. Under more forcible concussion, such as takes place in actual warfare, it might respond more favorably. It has the advantage of being a perfect conductor for the voice. It has the disadvantage of being made of hard rubber, and therefore possesses the danger of secondary foreign body injury. Ex-

perimentation shows it to be a little difficult to wear, and for long wear it would be inconvenient.

Cotton, saturated with glycerin or vaselin, is the cheapest of all, most available, easy to obtain, constantly on hand. It is practically within the reach of every soldier. The men are much more inclined to use cotton in the dry state. It is only when wet that it is of any value to prevent shock concussion. This wetting should be done by preference with glycerine or with vaseline. Either of these impairs the conduction of sonorous sound waves. Therefore, while it is the cheapest, the most easily available, the one most likely to be used, it has the disadvantage that it deafens the wearer more than any other.

It is suggested, in closing, that some arrangement be made by which several thousand of the "Tommy" could be purchased and supplied to the troops in the field.

It is also suggested that if any other form of mechanical apparatus, or of cotton saturated, is considered for use, it be bought in the same quantity and on the same conditions as the "Tommy," so that definite, actual warfare experiments can be used to determine which mechanical device or cotton is of the greatest value.

The Method of Analysis of the Barany Tests in Pathologic Cases.

LEWIS FISHER, M. D.,

PHILADELPHIA.

The writer presented a special chart which provides for all the salient features of the examination of the vestibular apparatus and for recording the various findings obtained by such examination. The first problem in any given case is whether one is dealing with a functional or an organic condition. If the chart shows all the responses to ear stimulation perfectly normal, a functional condition may be suspected. When the responses obtained on stimulation are not normal, the case should be considered as having an organic lesion. Such a deviation from the normal need not include all the responses. An impairment of even one response shows that one is dealing with an organic lesion.

Having concluded that the case presents an actual involvement of some portion of the vestibular apparatus, the next problem is to determine whether the case is one of peripheral or central lesion. This is the most important and at the same time most difficult diagnosis that the otologist is called upon to make. Many cases of cerebellar lesion or tumors of the cerebellopontine angle present symptoms similar to those observed in an affection of the labyrinth—the miscalled (according to the essayist) “Meniere’s disease.” On the other hand, the labyrinthine lesions not infrequently simulate cerebellar affections. The findings on ear stimulation are frequently the deciding factor in the diagnosis, and it therefore behooves the otologist to exercise the greatest care in determining this point. Some of the most important principles of this differential diagnosis are emphasized.

In a peripheral lesion all the responses are impaired, and conversely, the presence of any one normal response to stimulation indicates a normal labyrinthine and eighth nerve. A spontaneous nystagmus in the vertical plane, either upward or downward, indicates a central lesion. If stimulation produces a “perverted” nystagmus, then again the lesion is central. If the findings lead to the conclusion that the lesion is central, then our next problem is to attempt to locate the lesion more definitely within the cranium. The facility with which one is able to do this depends in a great measure upon how well one can visualize the various pathways constituting the vestibular apparatus. The simplest method of procedure is that of elimination. Beginning with the labyrinth, one proceeds brainward, considering each structure by itself. With good hearing and one or more responses on stimulation of the static portion of the labyrinth normal, the labyrinth itself and the eighth nerve are to be considered uninvolved. For information relative to the medulla oblongata and inferior cerebellar peduncles, one examines the responses obtained on stimulation of each horizontal canal separately. This test is performed routinely by tilting the head back 60 degrees after douching. If this produces normal horizontal

nystagmus and vertigo with past pointing, the medulla oblongata and inferior cerebellar peduncle of that side may be considered uninvolved. To determine the integrity of the pons, the response from the vertical semicircular canals are examined. These are tested when the ear is douched with the head 30 degrees forward—the so-called upright position. If the chart shows a normal rotary nystagmus with vertigo, past pointing and falling, it suggests uninvolved pathways in the pons and middle cerebellar peduncle of the side douched. The cerebellum is considered as not the seat of any gross lesion if stimulation of either ear or any canal produces a past-pointing of both arms in both directions.

With the chart critically examined in this manner, and all the possible points of involvement along the nerve tracts in mind, an attempt is made to find one location which would satisfactorily account for all of the impaired responses. Just as in neurology a certain group of symptoms occurring with a definite lesion are spoken of as the "symptom complex" for that lesion, so a certain group of phenomena obtained on stimulation has come to be recognized as the "phenomenon complex" for that particular lesion.

The essayist then proceeded to demonstrate his method of analysis by means of lantern slide charts, showing the brain and the different "phenomenon complexes." This method of analysis constitutes a means of approach in explaining the significance of impaired or absent responses to stimulation of the vestibular portion of the internal ear.

DISCUSSION.

DR. GEORGE F. COTT, Buffalo, said the otologist would encounter in future a great many toxic, neuritic and hysterical cases in which one response would be elicited, and then, after waiting five or six days, there would be no response from the healthy side and a response from the other. This was an important point. The technic of the examination was another important point. He cited an illustrative case, in which the patient, a woman, would be dizzy and would past point to the left every time a test was made. Finally

she was examined by Dr. Fisher and found to be absolutely normal. On account of the necessary technic the test would not be popular, except with those who appreciated its vast importance.

DR. E. M. HOLMES, Boston, emphasized the point that brain tissue is compressible, and the last part pressed upon gives, at least temporarily, the more marked symptoms. Any examination, however accurate and critical, would give wrong impressions unless repeated a number of times. These cases varied from day to day. At autopsy it was amazing to find the extent of the lesion in the cerebellum or at the cerebellar pontine angle, where the symptoms pointed to a lesion at the pons or cerebellum, and where the tests were misleading. It should be borne in mind that the most perfect findings, applied theoretically, would be misleading in these cases.

DR. FISCHER, closing the discussion, said that his work represented conclusions drawn from examinations of hundreds of pathologic cases, many of which had been verified by operations or autopsy. The scheme of pathways and method of diagnosis of location of the lesions as shown had practically left the domain of the theoretical and had become eminently practical. He was not surprised that the findings in regard to nystagmus and vertigo often did not go together. The demonstration of that point was the object of his work. These represented two separate afferent impulses traveling along two distinct pathways. Under pathologic circumstances something might occur which would leave one system of pathways intact and impair the other. Of course the question, which Dr. Lewis and Dr. MacKenzie had emphasized, was important. Vertigo, being a subjective response, could not always be relied upon, as Dr. MacKenzie had suggested. Fair conclusions, however, could be drawn as to the condition of the cochlea from examination with tuning forks, in spite of the fact that those are based entirely on subjective responses. In a similar manner the experienced examiner of vestibular cases is able to differentiate vertigo responses that could be depended upon from those that could not.

**Spontaneous Recovery From Lateral Sinus Thrombosis. A Case
With Very Unusual Features.**

RICHMOND MCKINNEY, M. D.,

MEMPHIS.

The patient, a boy eleven years of age, had complained of earache for two days. The ear had been discharging intermittently for two months. Examination revealed a small amount of pus in the canal, with a median perforation of the membrana tympani. The boy's temperature at 10 a. m. was 100 degrees F. There was slight pain on deep pressure over the mastoid tip. Warm boracic acid irrigation and the use of the customary ice bag was ordered. On the morning of the third day he had a temperature of 104 degrees, rising to 105 in the evening. Blood examination was negative as to malarial parasites, but there was a polynuclear percentage of 92. No leucocyte count was made. The opening in the drum membrane was enlarged by a free incision, but no pus was seen in the canal. At 2 o'clock on the fourth morning the temperature was 105 degrees plus, but went down under antipyretic measures to 102.5 at 10 a. m., rising again to 104 by 3 p. m. No rigors, no sweats, or other indication of intracranial involvement, were noted. Reflexes were normal. After consultation it was decided to open the mastoid. The bone overlying the antrum was eburnated, with no pus, until the antrum was entered, when a very small quantity of pus and some granulations were encountered. The antrum was completely exenterated, leaving a perfectly smooth cavity, with no sinuses apparent in any direction. The temperature fluctuated and was reduced from time to time by ice water sponging. The patient slept a good deal. The afternoon of the day subsequent to operation he complained of pain in the right shoulder, he was chilly, and quite somnolent. On the morning of the tenth day the mastoid wound, when dressed, was found to be perfectly clean and free from pus. At this time the patient complained of painful spots at the end of the spine, where a small red swelling was noticed. Blood count, four days after operation, showed 6,200 leucocytes, with a polynuclear

percentage of 84. The tenderness beneath the right scapula had developed a swollen area, which, under light ether anesthesia, was opened, and teaspoonful of yellow pus, of ordinary staphylococcus variety,* removed. Two days later a dram of pus was removed from the swollen area at the end of the spine. The chilly sensations and the temperature fluctuations were typical of sinus thrombosis, with occasional detachment of clots into the circulation. The abscesses were metastatic, confirming the suspicion of sinus thrombosis, other evidence of which was lacking. Eye grounds normal, no jugular rigidity or tenderness. Blood culture negative as to bacteria of any kind; leucocyte count not especially high, while polynuclear percentage was nearly normal at the last count. The mastoid was reopened and the lateral sinus explored. The sinus wall was greatly thickened and grayish, but a slight pulsation was noticeable. It was determined to wait a few hours before opening the sinus. The boy made an uneventful recovery, with no complications of any kind.

The essayist was convinced that there was a lateral sinus thrombosis, located above the knee of the sinus, but not occluding the sinus. The infection, in his opinion, took place through the venous channels, no involvement of bone anywhere being found. The quick change in the patient's condition after the second operation suggested that this exercised some influence.

DISCUSSION.

DR. WENDELL C. PHILLIPS, New York, said his attention had been called to spontaneous recovery of lateral sinus thrombosis during a long period of teaching operative surgery of the mastoid operation on the cadaver. During this time he had repeatedly discovered obliterated lateral sinuses, even in cases that had died from other diseases. But there was invariably evidence of purulent disease of the middle ear. From this he had become convinced that there was a certain proportion of cases in which spontaneous recovery from lateral sinus thrombosis took place, and that in every case the sinus was obliterated. His clinical experience had also borne this out and had convinced him that many cases of lateral sinus thrombosis, especially of atypical types, recovered spontaneously.

The friendly criticism was offered that this society should not give its approval of the use of the icebag in mastoiditis.

DR. GEORGE F. COTT, Buffalo, said many cases of lateral sinus thrombosis following suppuration of the middle ear did not come to operation because of spontaneous recovery. Many of the younger members of the profession were apt to operate whenever they found these typical symptoms; after more experience they were not so anxious to operate. No matter how much the temperature varied, the patient was not necessarily septic; they generally felt pretty well, slept well and had good appetite.

DR. E. M. HOLMES, Boston, had had better results in ligating the sinus and then using the curette. Secondary bleeding was rare after thorough removal of the clot.

DR. W. P. EAGLETON added that, from his own experience, he could state that the sinus could be ligated in any portion in three minutes. One could ligate above and below and obliterate the entire sinus.

DR. MCKINNEY, in closing the discussion, said he was glad to have had such a free discussion of his paper, but that the range of the discussion had not at all been confined to the subject presented by him. Indeed, he was rather reminded, by the trend of this discussion, of a conversation that occurred between two negro men who met in a country road. One of the negroes inquired of the other, "Say, nigger, whar is you gwine?" The other replied: "I'se gwine whar I'se gwine; dat's whar I'se gwine." So it was with this discussion, which ranged from the operative treatment of lateral sinus thrombosis to the question of the possibility of spontaneous recovery from lateral sinus thrombosis.

To Dr. Phillips' criticism of the use of the icebag, he would say that he was under the impression that most textbooks on otology mentioned this as a part of the routine treatment for mastoiditis, and even thought this was mentioned in Dr. Phillips' own book, but of course probably was mistaken. However, doubtless nineteen out of twenty otologists still use an icebag, to a certain extent, as this for a long time had been routine treatment. Personally, he had found neither advantage nor disadvantage from the use of the icebag, and did not advocate it as a routine measure, and in the case described

had really advised it more on account of the high temperature the boy was running, seeking the effect of ice in reducing high fever.

With regard to Dr. Cott's statement that this was not septic fever, he felt that if this was not, his teaching as to what constitutes sepsis had been erroneous. Certainly most of us have always thought that a normal or subnormal morning temperature, with a steady rise to 104 or 105 degrees, or higher, in the afternoon, then a rigor, with a sharp decline to normal or subnormal, was typical of sepsis, and he was afraid that if this was not true, all teachers and textbooks had been imparting faulty teaching. He wished to express his appreciation of the very generous and general discussion of his paper.

DR. COTT, replying to Dr. McKinney's request, reiterated the explanation he had given before the American Laryngological, Rhinological and Otological Society last year. The temperature, he claimed, was not due to sepsis, but to action of a proteolytic enzyme which digested the embolus, or fragment of an embolus, with an accompanying heat.

Chronic Sinusitis With Toxic Manifestations.

BY JOHN E. MACKENTY, M. D.,

NEW YORK.

The writer limited his discussion to two types of cases: manifest sinusitis with toxemia, and latent or concealed sinusitis with toxemia. Illustrative cases are detailed.

In all cases of chronic toxemia in which sinusitis is to be excluded as the cause, a detailed history should be taken, extending back to the limits of the patient's memory. The key to the whole situation may be revealed by the patient recalling the occurrence of an almost forgotten acute infection in the head. A former attack of influenza or of tonsillitis or one of the exanthemata, followed by an acute nasal infection, may awaken suspicion and start one on a still hunt for further evidence.

To set down a symptomatology from the study of sinusitis with toxic manifestations would be to invade the whole realm of toxic diseases, since all toxic diseases have symptoms in

common. In going over the histories of many cases, however, the writer found that certain characteristics take prominence: (1) History. The antecedent history generally reveals that the time of the onset is coincidental with an acute nasal or tonsillar infection. (2) Periodicity of symptoms. Remissions and exacerbations mark the progress of the disease as immunity is established or broken. It is noteworthy that in the worst cases these periods of immunity finally disappear as the patient sinks into a state of chronic intoxication. (3) Pain in the head. This is generally complained of either constantly or intermittently. It is located, usually, on the affected side, is frontal, retromastoid, occipital, or facial. (4) Pain in the neck. Its seat is over the trapezius and deltoid and it may radiate into the arm and to the occiput and mastoid. (5) Headache, which is to be distinguished from pain in the head. It may be deep-seated, central and bursting in character. It denotes sphenoidal congestion and in some cases may be accompanied by vomiting. It is probable that many cases of migraine are due to chronic sphenoiditis. (6) Mental depression, irritability, inability to concentrate, are frequently present, especially during acute or subacute attacks. (7) Nerve, joint and muscle pains may come and go with waxing and waning of toxic absorption. (8) Cardiovascular symptoms. The pulse rate generally exceeds the normal and is much increased by exertion. Under slight physical strain the pulse, during an acute attack, may go to 140. This irritability of the heart may be accompanied by dyspnea and oppression. (9) Temperature, as a rule, is remittent in type. In the more toxic cases, it may be continuous, with daily rise, usually at midday, to 100 or 101. It is aggravated by exercise. (10) Irritating gases, as formaldehyde, tobacco smoke, and exposure to cold and wind may bring on pains in the head or even precipitate an acute attack. (11) Blood and nutritional changes. Anemia and loss of weight, weakness and lassitude, are almost constant accompaniments of chronic toxic sinusitis. Long periods of seemingly good health, even years, may separate periods of activity in this disease. (12) Gastrointestinal symptoms. These may run the whole gamut in this region. Attention is directed to two suspicious manifestations: Spasm of the sigmoid flexure, and cecal pain.

Operation offers a fair prospect of cure. Some cases, however, are but slightly relieved, and it is suggested that these may be cases in which it is possible, later, to demonstrate deep-seated hyperplastic bone changes in the sinus walls. Too much must not be expected immediately after operation, as the cure may be delayed for months. Vaccines have materially helped in produced some final and permanent cures.

This condition may have its inception during childhood or early adolescence in some acute infection of the lymphoid ring of the nasopharynx. Many perplexing questions remain to be solved with reference to chronic sinusitis.

DISCUSSION.

DR. WILLIAM H. HASKIN, New York, called attention to the fact that the original monograph by William Hunter on focal infection gave almost every phase of the subject brought out today. It was one of the most important problems of the present time. Whatever the original cause, the important thing was to find the focus of infection. He could cite hundreds of cases of different conditions traceable to focal infection.

An Operation for Bony Occlusion of the Posterior Nares.

By L. E. WHITE, M. D.,

BOSTON.

After reviewing the literature relative to bony atresia of the posterior nares and methods of treatment thereof, the writer described the operation which he devised and which he thought was original until he found that Katz had employed similar technic.

After a failure in his first operation, following Uffenorde's method, it occurred to him that if the raw surfaces were farther apart, the danger of closure would be greatly lessened; and remembering also that perforations in the septum usually stay open, it seemed the logical thing to make a perforation in the posterior end of the septum involving the obstructing choana. The operation may be performed under local or, preferably, under general anesthesia, especially when there is double occlusion. Deflection of the septum or hypertrophy

of the turbinates should be corrected before attacking the atresia, as it is essential to have the best possible operative field. After the free use of adrenalin to obtain a bloodless field, the bony plate can be readily perforated with a long flat chisel held close to the septum. A triangular section is first removed, the forefinger being placed in the posterior nares to guard against accident. The bone is next punched out as thoroughly as possible, and the rough edges smoothed off with a mastoid curette. When the atresia is bilateral the other side is operated on in the same way. The posterior end of the septum is then removed by rongeurs, and after being smoothed off carefully, it is covered by the mucosa which has been previously cut and elevated so as to leave enough for this purpose. All shreds should be carefully removed and the nose wiped clean. Each nostril is then packed with a strip of gauze covered with cargile membrane or rubber tissue. The packing should be removed in twenty-four hours, and the subsequent treatment is only such as is needed to keep the nose clean and free from crusts. If the operation has been done thoroughly no further packing is necessary, nor will there be need for the wearing of any of the many devices recommended to keep the opening patulous.

Two cases successfully operated upon by this technic are reported and illustrated.

DISCUSSION.

DR. J. E. MACKENTY, New York, recalled having reported two cases, in 1896, of choanal obstruction, in which he advocated removal of the posterior part of the septum or the setting forward of the choanæ. A cure would not be obtained unless this were done, but the procedure would cure practically every case. Many of these cases die at birth.

Adenosarcoma of the Nose. Report of Four Cases.

BY LEE M. HURD, M. D.,
NEW YORK.

From the clinical and microscopic findings, it is hardly possible to determine, in the early stages, whether the growth is of a benign or malignant character; all such growths, there-

fore, should be looked upon as of low grade malignancy. Adenosarcoma is conceded by some pathologists to be the most frequent form of malignant disease of the nose. Though it is the least malignant, two of the cases reported had recurrences after most extensive excision. Polyps were associated with two of the cases reported.

Two Cases of Latent Mastoid Suppuration; Perisinus Abscess; Operation; Recovery; X-Ray Findings.

BY WILLIAM B. CHAMBERLIN, M. D.,

CLEVELAND.

Two cases reported emphasize: (1) The mildness of the initial symptoms; (2) the length of time elapsing between the initial symptoms and the more evident signs of mastoid involvement; (3) the extensiveness of the latter as disclosed by the operative findings; (4) the value of stereoscopic X-ray examination of both the normal and suspected mastoids in the diagnosis of cases of obscure or doubtful diagnosis. The cases further emphasize the danger of pus under pressure, and the rapidity with which osteonecrosis occurs when the bone is subjected to its ravages. In each of these cases a large cell was found at the mastoid tip, and in each pus under extreme pressure was encountered. As a result, there was a rapid erosion of the bone overlying the lateral sinus. Fortunately, in each case there was a concomitant effort at repair, as evidenced by the protective granulation which covered the sinus. These cases also show the wisdom of exercising the greatest care, when protective granulations are encountered, in leaving them undisturbed, unless positive indications of the involvement of the interior of the sinus are already present.

DISCUSSION.

DR. PHILIP D. KERRISON, New York, said the clinical histories reported by Dr. Chamberlin were particularly interesting, first in showing the conservative processes which frequently protect the sigmoid sinus during mastoiditis; second, in drawing attention to what Dr. Chamberlin called latency in mastoid disease, and third, in emphasizing the importance

of X-ray work in these cases. We are all familiar with cases of intrasinus involvement in which the outer sinus wall exposed during examination shows no macroscopic signs of disease. On the other hand, a sinus wall, thickened and covered with granulations, after removal of contiguous diseased bone, very often goes on to uneventful recovery. Dr. Chamberlin's term, "latent mastoiditis," is a very useful one. It describes a large number of cases in which the patients are admitted to the hospital for observation rather than immediate operation. Many such cases come to eventual operation, but large numbers recover wholly without surgical intervention. Periodic X-ray pictures in such cases would throw considerable light on processes of repair, about which we actually know very little.

The speaker referred to a case which had recently come under his observation, in which an X-ray picture showed positive involvement of the mastoid cells of the left side. This patient was not operated on and went on to apparently complete recovery. An X-ray picture taken two months later showed very distinctly the process of repair—i. e., the cells previously involved being very largely cleared up and showing approximately the appearance of the opposite sound mastoid.

DR. TALBOT R. CHAMBERS, Jersey City, had had hundreds of cases of aborted mastoid disease in which he had ordered twenty minutes of icebag and forty minutes of hot water.

DR. ARTHUR I. WEIL, New Orleans, had always thought the X-ray most useful in making a diagnosis of mastoid diseases in uncertain cases, also as a confirmatory measure in cases in which the diagnosis had already been made. He had always had his diagnosis confirmed by X-rays in cases on which he operated. He had had no experience with stereoscopic plates. The X-rays did not deceive; when they showed destruction of mastoid cells, the disease was there. He referred to two cases in which there was a little deception. In each case there was mastoid involvement, the history in each covering two years and more, during which time there was slight discharge and slight ear disturbance, lasting for a day or two at a time. One complained of facial paralysis, the other of headache on one side, and some mastoid pain and a feeling of malaise. Both showed the same picture, and in each the

diagnosis was mastoiditis. He operated, expecting to find latent mastoiditis with destruction of cells, but he found in each complete sclerosis. The mastoids were not diploetic, but were completely sclerosed, showing that the condition was very chronic. After operation each case cleared up completely. There was no latent mastoiditis, in the sense of pus and destruction.

DR. CHAMBERLIN, in closing the discussion, agreed with Dr. Kerrison's contention that the history and, above all, the clinical findings, should take precedence over everything else in diagnosis. He would not perform a mastoid operation on X-ray findings alone. X-ray findings would help in just this class of cases more than in any other. There was need for the taking of more serial X-rays in cases of otitis media which have gone on to resolution. It was difficult always to say that this cloudy cell would go on to resolution and another to suppuration.

The Pathogenesis of Bronchial Asthma.

BY WOLFF FREUDENTHAL, M. D.,

NEW YORK.

The writer does not accept the general belief that an attack of asthma is characterized by a constriction of the bronchioli traceable to the vagus nerve. While he is not able to prove that this view is not correct, he believes that an attack is brought about not by a spasm of the constrictor fibers coming from the vagus, but rather by a paralysis of the dilator fibers. This accords with his view of the etiology of asthma in general. The unusual occurrence of a spasm lasting for such a long time, as it often does in bronchial asthma, would seem to favor his view that in so-called spasmodic or bronchial asthma one is dealing with an atony or paresis or paralysis of the bronchiodilators and not with a spasm of the constrictors. The sympathetic system is also of great importance in this connection. The ramifications from one system to the other are numerous, and there may be no disturbance of the sympathetic when the symptoms incline toward an irritation of the vagus, and vice versa. While the action of these nerves is not clearly established, other symptoms apparently favor

his theory. For example, the abdominal muscles that are concerned in expiration are quite flaccid even during expiration, which could not happen if a spasm of the expiratory muscles had been present. Another point in favor of his theory is the frequent development of pulmonary emphysema, which, it has been said, is promoted by atony or paresis or paralysis of the smooth muscles of the bronchi. Atony never means spasm. Nor is it necessary to demonstrate a spasm of the inspiratory muscles, for at the beginning of the asthmatic attack the patient has difficulty only in expiration, which means that through a paralysis of the dilator muscles the others gain mastery and contract. Later on during an attack, when the lungs become overdistended, there is difficulty in inspiration as well. It has been found, however, by fluoroscopic examination, that the lungs do not expand and that the diaphragm remains stationary. This is an important finding, as the diaphragm under normal conditions is the main factor in inspiration, a factor that has been eliminated entirely through atony or paresis or paralysis in an acute attack.

Another point in favor of the theory advanced is the action of adrenalin and other drugs. When injected subcutaneously or applied endobronchially in an acute attack of asthma adrenalin produces an almost immediate effect thought to be a dilatation of the bronchioles. It has been found, however, by experiments upon rabbits and cats, that adrenalin usually produces "unmistakable constriction of the bronchioles." But when the bronchioles were initially constricted by other drugs, the normal effect of adrenalin was reversed and bronchial dilatation was produced. Besides, adrenalin acts only on those tissues which are innervated by the sympathetic nervous system.

It may be concluded that paralysis of the sympathetic and stimulation of the vagus show the same symptoms and are closely related not only symptomatically but also etiologically. As long as this fact stands, so long is one justified in speaking of the asthmatic paroxysm as due either to an irritation of the vagus or to paralysis of the sympathetic. The essayist, for the reasons stated, is inclined to the latter theory.

A further point in favor of this theory is added: The essential distensible air spaces of the lung are the infundibula, or

the terminals of the bronchioli. As the infundibula are regulated by the musculature of the bronchioli, these are justly mainly considered. The asthmatic sufferer involuntarily endeavors to keep his infundibula filled—that is, to keep his lungs in an inspiratory position. In that way he reinforces the elastic powers which dilate the bronchioles, and thus aids expiration. But since these elastic powers are out of function through some kind of paresis, no deep inspiration can be taken, no expiration aided in that way.

In conclusion it must be acknowledged that the constrictor muscles of the bronchioli during an asthmatic attack are not in a spasmodic condition, as heretofore accepted, but that they are in a state of artificial tonus brought about by the paresis of the inspiratory muscles.

Plastic Surgery of the Head and Neck.

BY THOMAS E. CARMODY, M. D.,

DENVER.

The writer enumerates certain points of technic which should be borne in mind in this field of surgery, some of which are given below. The stress laid upon the blood supply of the face as being all sufficient, in the plastic surgery of the face, has led to false conclusions as well as to carelessness in the handling of flaps. The location of incisions is very important in any operation about the face, and attention thereto may obviate the necessity of many secondary plastic operations. They should be made parallel, if possible, to a muscular fold, they should be slightly curved rather than straight, and parallel with the lines of the face rather than across them. Apposition of the edges must be accurate if scarring is to be avoided. Incisions made obliquely to the surface approximate more nicely and with less scarring than those made at right angles. Incision should be avoided close to bone on account of the tendency to tie down, which is so frequently seen where an abscessed tooth is opened on the face. An abscess, if possible, should be opened through sound tissues, unless the tissue is necrotic, at the most prominent point.

Flaps must be taken in the direction of the blood supply; they must be of sufficient length to reach the defect without

tension; they must be well approximated by sutures or dressings. Subsequent tension by muscular strain of any kind must be avoided.

Unnecessary removal of bone or tissue in either congenital or traumatic cases is to be avoided, where there is a possibility that the tissue may be visible. Loose teeth should be saved, if there is not a great amount of infection, and these, with their bony sockets, may be of value in supporting flaps.

Elaps may become gangrenous from lack of blood supply, from pressure of dressings, or from twisting of pedicle, either of which will produce dry gangrene. Moist gangrene may result from infection. In the latter case, active irrigation with soda solution or some of the newer solutions, as the Carrel-Dakin, is required.

Healthy tissue, without scar, should always be used, especially in secondary operations. Coaptation is interfered with if scar tissue is left, even on the edge of the flap.

The essayist's preference is to leave a wound to heal without dressing, as the protection of the scab formed by the drying of the serum is sufficient.

Sutures of silkworm gut, horsehair, and in some cases metallic sutures, and, where it is necessary to suture the mucous membrane, fine catgut, are used. The method of introduction of sutures may determine the result. Continuous sutures, either completely through the skin, or the so-called subcuticular, may be used. Interrupted sutures are more frequently used, but care must be taken not to turn the edge of the tissue. This may be avoided with better approximation by using the staple or the mattress suture. Sutures should be removed in the shortest possible time.

DISCUSSION.

DR. WILLIAM W. CARTER, New York, was glad to see that plastic surgery of the nose and face was coming into its own. He had been particularly interested in depressed deformities of the nose due to disease and to traumatism. Ten years ago he had presented before this Society his bridge splint, an instrument which he had devised for the correction of depressed and irregular deformities of traumatic origin; shortly afterwards he began to use bone transplants taken from the rib

for the correction of those cases in which there had been a considerable loss of the bony framework of the nose and which were not amenable to the bridge splint. The excellent results which he had secured by these methods in the large number of cases which had come under his observation led him to speak highly of their efficiency.

Dr. Carter demonstrated by lantern slides some of the results secured by his methods, and described the use of the bridge splint and his bone transplantation operations. He also showed by X-ray lantern slides the changes which occur in transplanted bone, in some instances the bone having been transplanted ten years ago. These cases showed that the transplant is not absorbed, but that it lives and grows, its growth being governed by the functional demands of the part. He advised the use of the costal tissue, the periosteum on one side of which is to be preserved. In some instances he used a transplant removed from the costal end of the rib, composed of two-thirds bone and one-third costal cartilage; this preserves the flexibility of the nasal tip. In marked depressed deformities he often superimposes several fragments of bone. This is preferable to the use of a single large transplant, as the small pieces have relatively greater osteogenetic capacity. Dr. Carter expressed a decided preference for the rib for transplantation purposes and said that he had never experienced any difficulty in removing a two-inch fragment and that the space is soon filled in by bone growing from the cut ends of the rib. In none of his cases have any dangerous complications followed this procedure, and the patients, as a rule, are discharged from the hospital in from five to seven days. No scar follows this operation, as the transplant is introduced from within the nose. The upper end of the transplant is securely anchored under the periosteum over the frontal bone, with which it forms a firm bony union. The correction of the deformity is permanent.

DR. LEE COHEN, Baltimore, said the required thickness of the transplant was the point which decided whether the tibia or a rib should be used. If a long thin span was needed he used a rib. He never used the entire thickness of the rib. Instead of taking out the entire rib he made a pattern of a metal strip the size of the piece of bone he wanted to use, sterilized

it, exposed the rib, laid the metal strip on it and marked out the size of the piece to be removed, the upper two-thirds over bone, the lower third over the sternocostal cartilage, so that bone is used in regions where bone existed in the nose, and cartilage below, where cartilage should be. The outer table of the rib, down to diploeic structure only, is used, this being removed with narrow straight chisel. The thin plate of bone for the transplant, the size of the metal strip, is removed and transplanted over nasal dorsum through an incision within the nasal vestibule. By taking a thin strip of the rib there was no danger of sepsis, and if the work was done carefully the pain in the chest is reduced to a minimum and there would be per primam healing. The discomfort and inconvenience from cutting the rib through was thus obviated. All his work was performed from the interior of the nose, no incision being made from without. He used a quadrilateral strip of costal cartilage, anchored at the nasal spine below and extending upward between the two layers of septal mucous membrane in contact with the transplant on dorsum nasii above, whenever the quadrilateral cartilage of the nose has been destroyed by suppuration or trauma.

DR. OTTO J. STEIN, Chicago, thought the paper would have been more valuable if more detail had been given of the method employed. Referring to Dr. Carter's use of bone transplants with periosteum, he had been taught to believe that the periosteum should be removed, because, if allowed to remain, there would be a great deal of increase of bone in the transplant. Bone transplantation of the nose was now done submucously from within the nostrils.

Woody Phlegmon of the Neck (Reclus). Report of Two Cases.

By THOMAS C. WORTHINGTON, M. D.,

BALTIMORE.

Focal infection has an important rôle in the causation of this disease. The prolific bacterial flora of the mouth, throat and nasal cavities, and the rich lymphatic system of the neck, presumably account for the greater frequency of woody phlegmon in this region than elsewhere in the body. The differentiation of woody phlegmon lies between cancer, tuberculosis

and actinomycosis. Its firm and boardlike feel, the sense of resistance of the skin and underlying tissue, the clearly defined edges, the persistent flatness of the greatly thickened mass, its steady encroachment upon the surrounding tissue without much pain, present a picture which is characteristic and which is distinctive of the woody phlegmon of the neck. The treatment is by incision and hot fomentations. Vaccines have been used. The combined treatment has given the best results. Excision is not practicable because of the nature and extent of the tissues involved.

An Answer to Opponents of the Radical Mastoid Operation.

BY W. C. BOWERS, M. D.,

NEW YORK.

After a general consideration of the radical mastoid operation, the various objections thereto and the causes of failure, followed by the technic which he recommends, the author gave the following results of 83 actual radical mastoid operations: Deaths, none; complete facial paralysis, none; partial facial paralysis, one. Of these 83 cases, five are at present under treatment. The 78 others have been recently asked to report for examination. Of the 55 who reported, the following particulars were learned:

Discharge		Hearing	
None	42	Better	23
Considerable	4	Much better	10
Occasional	9	Same	19
		Worse	3

From this experience and his study of the published records of many operations, he draws the following conclusions:

1. That many men are performing radical mastoid operations without having acquired reasonable proficiency.
2. That many radical operations are performed when not indicated.
3. That by many operators too little consideration is given to preservation of hearing.

4. That many cavities are not properly cared for either by the surgeon or by the patient.

5. That it is possible to get dry cavities and improved hearing, and that these results are attainable in most cases.

6. That the operation is not dangerous and that complications are seldom unavoidable.

7. That the condition calling for operation is usually a very dangerous one and that it is too frequently dealt with lightly.

Eustachian Irrigation in Certain Mastoid Operations.

By J. W. JERVEY, M. D.,
GREENVILLE, S. C.

After the operation itself is fully completed, and before the insertion of drainage and suturing, the patient's head is turned face up and a mouth gag inserted. An ordinary eustachian catheter is placed through the nose into the pharyngeal orifice of the tube, preferably under direct inspection with a Holmes pharyngoscope. An assistant holds a sponge, by means of forceps, well up in the oropharynx, to prevent leakage of the irrigation fluid into the lower pharynx. Then with the aid of a rubber bulb syringe and tubing with a tip to fit the catheter, a warm 1/5,000 bichlorid solution (one to two syringefuls) is injected through the eustachian catheter passageway, middle ear, antrum, and on out through the exposed mastoid field. It is necessary that the catheter have the proper curve. It should be introduced well up into the orifice. The catheter should be of small caliber, and the distal inch should be uncurved, with the aperture pointing at an angle of about forty-five degrees from the long axis. By this means the tip can easily be inserted to the isthmus. It may be necessary at times to remove the blood clot from the antrum and middle ear by direct suction or irrigation, before a flow can be established for tubal irrigation.

Tubal irrigation is indicated in every simple mastoid operation where the tympanum and tympanic membrane are intact. For anatomic reasons the procedure is more difficult of accomplishment in children than in adults. However, it is of less urgency in children, as the consideration of time of recovery is usually of less importance economically.

Three cases are reported.

DISCUSSION.

DR. LEE M. HURD, New York, thought it perfectly good surgery to remove adenoids and tonsils in the case of a child at the same time that the mastoid operation was performed. He had never tried eustachian irrigation; instead of using the catheter alone he had used the catheter and then irrigated.

The Value of Ear Examination to the Neurologist.

BY ISAAC H. JONES, M. D.,

PHILADELPHIA.

The internal ear has such an intimate relation with the central nervous system that its study is of especial interest to the neurologist. The ear tests are of particular value in making a differential diagnosis between labyrinth and intracranial lesions and in furnishing additional data in intracranial localization. Nystagmus and vertigo, with loss of equilibrium, associated perhaps with nausea and vomiting, may be produced either by a disturbance of the internal ear or by an intracranial lesion. In many instances the symptoms of internal ear disturbances and of a cerebellar lesion are identical. It is in such a differentiation that the ear tests are often invaluable. A careful neurologic study often indicates a lesion of the cerebellum, whereas the ear examination, by giving additional data to the neurologist, demonstrates conclusively that he is dealing with a lesion of the labyrinth.

A differential lesion between peripheral and central lesions by means of the ear tests depend on certain general principles, which are stated *ad seriatim*. The outline thus given indicates how additional data may be furnished to the neurologist by the ear tests in determining whether he is dealing with a lesion of the internal ear or of the brain stem or cerebellum. In the broader field of localization, examination of the ear and of the vestibular apparatus is also of distinct value. The particular feature of the ear examination is that the aurist sends in a stimulus to the brain centers, and then notes the responses of the different parts of the body to this stimulus.

In order to utilize the knowledge obtained from these tests it is essential to have in mind the various pathways consti-

tuting the vestibular apparatus; and in order to obtain reliable data from an ear examination it is essential that the technic of examination be accurate and painstaking. Since it is peculiarly an ear examination, the otologist is peculiarly fitted to carry out such an examination. One purpose of this paper is to furnish a practical guide for the otologist in undertaking the examination of patients; it is also offered to the neurologist so that he may become familiar with the ear aspects of the work, in order to realize the significance of the reactions as reported to him.

NEW YORK OTOLOGICAL SOCIETY.

Meeting of March 26, 1918.

Fistula Test After Radical Mastoid Operation.

DR. PHILLIPS: This man has had a chronic suppuration of both ears since childhood, with no unusual symptoms beyond the persistent discharge. His right ear has been worse and he has had excessive granulations. This fall it seemed that the tendency to excessive granulation became greater, and, while he did not complain of any pain or any severe symptoms, the discharge continued so profuse that I advised him to undergo the radical mastoid operation on his right side, which was the worst ear. He submitted to this operation and made a very good recovery, but the discharge has continued. However, it is much less in quantity.

About a month ago he began to complain a little of vertigo and he has had a few attacks, but never severe. He had been away on a business trip, and when he came back I employed the fistula test on him and induced very decided nystagmus. The attacks have subsided. He feels perfectly well and he has been able to attend to his business right along, but he certainly shows the fistula test to a very remarkable degree. For this reason I brought him here tonight, because I thought it would be interesting to show the test.

DISCUSSION.

DR. BLODGETT: Why was the right ear chosen?

DR. PHILLIPS: Because it was very much worse than the left—in fact, something happened that is very apt to happen when you operate on the worse ear, viz., the other one will gradually dry up.

DR. EAGLETON: Can he hear with both ears?

DR. PHILLIPS: He does not hear as well with the right ear as before the operation. There is quite a difference.

DR. BLODGETT: In view of the results of this case, if you had another case that was of the same persistence, would you advocate a radical mastoid operation?

DR. PHILLIPS: In this individual case I feel that I have even made a gain, because he would have gone on to the develop-

ment of a fistula anyhow, but I think that fistula is far less dangerous after a very radical mastoid with a large open cavity than it would be in one fully closed with granulations.

DR. BLODGETT: We had a school teacher who in one ear had a radical operation performed, and ended up with absolute deafness. The other ear was an O. M. P. C. We did nothing for it, but she recovered so that she could continue school all right.

DR. PHILLIPS: The only question in my mind is what is the best thing to do with this case as it is today.

DR. BLODGETT: Watch it.

DR. DUEL: May I ask Dr. Phillips, in view of the fact that this man has a fistula, is it not true that the greatest danger he now faces is that of developing an acute labyrinthitis?

I have been mildly objecting to this fistula test, as it is practiced, ever since I first saw it. If this man has a fistula, (which he undoubtedly has) he has a granulating surface connected with the membranous labyrinth; is it not possible that an acute labyrinthitis may at any moment be started from this granulating surface by directly invading it?

DR. PHILLIPS: Yes, and walling it off.

DR. DUEL: Now, isn't it dangerous to keep on demonstrating the practical use of this fistula test? You do not know but that the force excited may at any demonstration break through the weakened membranous wall. Once the thing is demonstrated, allowing that it is justifiable once, I think you ought to make a record that the man has a fistula and never repeat the test.

DR. PHILLIPS: I hold the very same views Dr. Duel has in regard to repeating the demonstration.

Now this is a traveling man, and in order that he may be protected I gave him a list of otologists in various parts of the country where he travels. The result has been that almost all of them have tested him out.

I fully agree with Dr. Duel that this man should not be subjected to further operation.

DR. BLODGETT: Dr. Phillips mentioned the fact that the man had one or two attacks of vertigo. Suppose that increased, Dr. Phillips, and you had to pay attention to the vertigo, what would you do then?

DR. PHILLIPS: The idea is, should he develop a labyrinthitis, then operation might be imperative.

DR. HARRIS: The Chair would like to ask Dr. Phillips what the condition of his cochlea is.

DR. PHILLIPS: He has hearing. The hearing isn't quite as good since the operation as it was before. I have tested his hearing. You can all see that he is in good health, and he is attending to his regular business right along.

DR. PAGE: I would like to speak of a similar case in which the fistula test was not demonstrated until after the radical operation had been performed, just as in this case, I believe.

DR. PHILLIPS: This case had no symptoms of any kind. I am trusting to my memory, but I am almost positive that I repeatedly made the fistula test on him before I operated.

DR. PAGE: In the case I referred to, a negative fistula test was found in the routine examination before the operation. A fistula was demonstrated at the time of the operation in the horizontal canal, but it was evidently so protected by cholesteatoma that it did not show beforehand. After the operation the man's hearing was improved—shortly after the operation—and the fistula test was demonstrable.

I saw him a month ago, for the first time in about two years, and his hearing is practically gone. He hears a loud voice with the noise apparatus in the opposite ear, but his hearing is nearly gone, whereas before he had very good hearing. While I didn't put him through the test of equilibrium, he gave no history of any sudden attack of labyrinthitis.

DR. DUEL: He has probably lost his static function as well as his hearing.

DR. PAGE: He probably has, but he had no sudden labyrinthine whirl or loss.

DR. SHARP: Mr. Chairman, I should think that in six months this man's hearing would be entirely destroyed. I don't see how he can have a fistula there in his horizontal canal without eventually destroying the action of the semicircular canals and also destroying the cochlear nerve.

I think we often find, after these radical cases, the patients hear for a while, even better than they did before they were operated upon, but gradually, in a year or eighteen months, they completely lose their hearing.

I should think the patient has a subacute inflammation in his semicircular canal, which will very soon destroy hearing and also equilibrium.

DR. HARRIS: Dr. Sharp's observation is a particularly interesting one, so far as the radical operation is concerned. It would be interesting to know what some of the experiences of the gentlemen have been. A suggested comment on what he says is that very interesting fact of the temporary disappearance of all labyrinthine function and its return. I think we have had a number of those cases reported in this Society, where both the static and cochlear labyrinth were for a time entirely dead; there was, as far as we could make out, no function at all, and later it came back.

It is one of those puzzling things for which I have never heard a satisfactory explanation. It is quite another question, of course, as to what the natural course of events in the labyrinth is, or may be, following the radical operation. Perhaps some of the gentlemen have followed enough of their cases to be able to make some criticism on that point.

DR. DUEL: Mr. Chairman, isn't it perfectly possible for function to be stopped temporarily by a perilabyrinthine inflammation? This happens in very many perilabyrinthine inflammations. There is no way of knowing positively. In one case there may be a perilabyrinthitis followed by extension and complete destruction of function. In others, no extension and only temporary suspension of function.

I do not agree with Dr. Sharp that because this man has a fistula symptom he will lose his function in a year or two. He may not lose it in twenty years. He may occasionally have some evidences of a perilabyrinthitis, some slight dizzy spells; he may have a gradual loss of hearing, but he will not necessarily lose his hearing or his static function unless he develops an endolabyrinthine inflammation.

DR. PHILLIPS: There are just two or three points that seem to me worthy of emphasis. In the first place I see no reason why this man's symptoms should materially change, excepting that I believe the time will come, if he lives and if there are no more serious symptoms that appear, when the fistula test will disappear, on account of the filling in of granulations and the tendency to scar tissue which will form in that area.

I cannot quite agree with Dr. Sharp that the man will gradually become deaf. He may, and he may not. I do not recall many cases where I have seen exactly this same train of symptoms, but I certainly do not recall any cases where they have had these symptoms and necessarily became deaf afterwards—even after some years.

Dr. Eagleton has touched upon an important point, of course, and at this moment I am not prepared to agree with him as to further operative interference.

I may say this man did have cholesteatoma, but the removal of small areas of bone around the fistula, to my mind, might produce some results that would be more dangerous than if let alone.

DR. PAGE: Mr. President, the case that I referred to a little while ago bears out to some extent Dr. Sharp's prognosis, in that while the fistula test was done before and was not observed, at the time of operation a very definite fistula was found in the horizontal semicircular canal. The cholesteatoma was removed from it and a celloidin film was used to protect this point, because a little piece of cotton or sponge touched in this area would cause his eye to move while he was under the anesthetic, and we were all very much interested. I thought his hearing would be disturbed, but it was considerably improved immediately after the operation over what it had been before, owing to the fact that a lot of granulation tissue was cleaned out of the tympanum and that his radical cavity skinned over after two months or so. Then he disappeared and I only saw him a short time ago, and he had the ordinary amount of cerumen and epithelial debris in his cavity, which could be cleaned out. I asked him about his hearing in the ear and he said he could not hear with it; the hearing had gradually left it.

What took place in the labyrinth it is hard to say, but it bore out Dr. Sharp's idea of the question. Still he had had no labyrinthine attack.

DR. PHILLIPS: Mr. Chairman, might I just emphasize one more point that Dr. Eagleton just made? I quite agree with him that the tendency among the leaders in otology in this country today is to do too few radical mastoids. I think in a case of this type with cholesteatoma, and where the discharge

is persistent, with excessive granulation tissue and odor, especially when the discharge is of rather dark brown color, showing that there are particles of necrosed bone that are coming away with that discharge, there can be no argument except the argument in favor of the radical mastoid.

DR. HARRIS: The Chair would like to ask Dr. Page if he feels, from an examination of his patient, that the loss of hearing was primarily from the labyrinth; did he test the labyrinth?

DR. PAGE: I am sorry to say that no test was made. The man came in with acute tonsillitis and I had not looked at his ear, but I asked him about his hearing and, when he said he had no hearing in his ear, I simply stuck a noise apparatus in his other ear and shouted at him, but he barely heard the sound.

DR. HARRIS: Undoubtedly in this case the labyrinth was out of business, or very largely so. But I believe it is true in many postradical operations that the reduction of hearing can be ascribed to the middle ear entirely; to the process that has gone on there, and the conductive apparatus is so seriously reduced.

Improved Rotation Chair.

DR. PHILLIPS: Mr. Chairman, I am very sorry that Dr. Friesner is not here to demonstrate what we believe to be an improved rotation chair. Dr. Friesner and I have been working on this a good part of the winter.

The chief improvements consist of a foot brake that will not get out of order and a chin rest to maintain the correct position of the head during rotation.

DR. HARRIS: We are indebted to Dr. Phillips for bringing this chair over tonight. Certainly the Jones chair, so-called, has not met all the demands which have been made upon it this winter.

DR. PHILLIPS: The Hospital Supply Company is making this chair.

Multiple Cortical Hemorrhages of the Brain With Acute Middle Ear Inflammation.

DR. EAGLETON: Mr. President, about a year ago, as some of you may remember, I presented the case of a man who died

seventy-two hours after his first earache, and also presented a brain showing multiple hemorrhages in the whole of its cortex, and I expressed the opinion at that time that it was due to what we called then a streptococcus mucosus; that it was a general infection.

I wish to offer the following contribution with a postmortem. Of course, now we know these cases are pneumococcic infection of type three, which my former case was, and I wish to call attention to the insidiousness of the onset of all these cases, the virulence of the poison, the characteristic changes in the brain that are predicted from my former case—that is, multiple small hemorrhages into the pia arachnoid, the presence of the pneumococci in the accessory sinuses of the nose, showing that this is not an ear condition at all; that the pneumococci attack the mucous membrane of other parts of the body, and that in these virulent cases, judging from what we find, surgical intervention is hopeless, and what we must look for is a treatment of the blood condition itself.

The case is as follows: On July 20th, John S., private, had his first earache. When he arrived at the hospital the following day, the 21st, his drum had ruptured and there was a watery discharge. The discharge continued during the 22d and 23d; he was examined by Captain Brooks, who said he might have slight tenderness over the mastoid. He had been feeling comfortable all day, as far as his neighbors knew, on the 24th. However, on the 23d he had had a temperature in the evening of 102, although little attention had been paid to this. On the 24th, four days after the initial earache, his temperature was 101 $\frac{2}{5}$. The nurse states that on the whole of the 24th he acted rather stupid, as if he felt sleepy, but was easily aroused and talked. At 3:30 without cause he vomited while the nurse was syringing his ears. At 5 o'clock, as the nurse passed by the bed, he said, "I do not think, nurse, I can hold that basin to my ear to be syringed," but when she brought the basin he sat up and held it. Fifteen minutes later, at 5:15, as the nurse passed, he asked her for a drink of water.

I passed the foot of the man's bed, in making the rounds at 4 o'clock, and thought there was nothing the matter with the man except that he had an acute earache. Suddenly at 6

o'clock, while I was in the ward, the man vomited and my assistant ran to his bedside and found the man in a coma; his pupils were widely dilated. I said to my assistant, "This man has had an acute labyrinthitis, he will come out of it in a few minutes"—but he didn't. Following the attack he became slightly conscious, but he could not be aroused. Half an hour later he had a chill. We performed a lumbar puncture. The fluid was cloudy and streaky. Then there was an examination of the eyes. The bacteriologic examination showed pneumococci, and the precipitant test was positive to the third type. This was done in half an hour. I was very much impressed by the laboratory work at the Base Hospital. They came back and said, "You have a pneumococcus meningitis of type three from a precipitant test"—and this was done in half an hour. The blood culture was negligible. He died in deep coma after six hours of the first alarming symptoms.

Now, from these frequent smears and cultures we can say in these virulent cases, I think, from this report and other reports, that these cases really are only incidentally ear cases; that if I had opened the man's mastoid, as we did at the post-mortem, we would have found a wet mastoid, but the same process was in his frontal sinus of the opposite side, through both ethmoids and through the sphenoid, and I am sure if we had operated upon him we would have found what was giving him the infection.

DISCUSSION.

DR. HARRIS: This is certainly a most unusual case which Dr. Eagleton has reported. I doubt if any of us have had a similar experience.

DR. PHILLIPS: I would like to congratulate Dr. Eagleton on the thoroughness of his report of this case. It is a valuable contribution and one, I think, which we will be able to make a good deal of use of.

I would like to know if the Doctor mentioned the examination of the sigmoid sinus, the lateral sinus and the jugular vein; was there any indication of any trouble at all there?

DR. EAGLETON: No.

DR. DUEL: I thought that very likely his infection in the meninges might have been through the aqueductus cochleæ.

I have had four acute labyrinth cases without any apparent gross involvement of the mastoid. Three of them died inside of seventy-two hours; that is, the infection had been so rapid from the middle ear directly into the labyrinth that there had been no time (as fortunately happens in most of our acute labyrinth cases) for this blocked off condition of the aqueductus cochleæ to take place (by a few hours, or a few days) before the endolabyrinth involvement. As I said, three of them died within seventy-two hours, and in the fourth one, some good fortune gave the patient time enough to block off the aqueductus cochleæ before his labyrinth had been invaded. I have seen no case of acute direct invasion recover except that one. They nearly all die very rapidly from meningitis.

I thought this man might have done the same thing: involved his meninges by this direct route through the labyrinth.

DR. EAGLETON: I think so.

Mastoid Abscess Followed by Fatal Issue.

DR. LUTZ: I would like to report a case. I saw a little boy who had had an acute mastoiditis, on the left side, about Thanksgiving time. This subsided in about four or five days and the ear dried out. About a week later I removed his tonsils and adenoids. He recovered from that and had no trouble. Along about the Monday before Christmas he complained of an earache. I went to see him, and it was the same ear that had troubled him before. I opened that ear and he was better the next day—he was very much better the next day. On Thursday he had a cough and some pain in his right side. That was worse on Friday and a pneumonia was made out on that side—he had the temperature, etc., but no chill. Saturday and Sunday he went along about the same. Sunday afternoon he had a marked deafness; his deafness was very markedly increased, and in looking at his ear I noticed it was dull and bulged a little bit. I opened that ear and got a little clear fluid from it. I had looked at this ear three or four times. I took the specimen and left him. Sunday night he became unconscious, and then the question of a mastoid operation came up. We did a lumbar puncture and got absolutely normal fluid. On Monday evening he died at about 7 o'clock. We performed an autopsy on the head that night at about 9 o'clock,

and in taking off the calvarium the dura looked apparently clear, but there seemed to be spots showing through. When the dura was removed, there were distinct patches all over the brain on the upper surface; on the lower surface of the brain there was absolutely nothing. The left mastoid was opened—the one that had been troubling him—and the mastoid cells found full of pus; and then the right mastoid was opened, and that was found full of pus.

The boy had had absolutely no complaint at all from the right ear until the day before; the left ear had given no trouble at all during the interim from Thanksgiving to Christmas, and the left ear healed, the drum closed, and there was no trouble at all. When the question of doing the mastoid came up and we got a clear spinal fluid, we decided to postpone it another day, and then the same day he died.

That was an interesting case to me. The boy had an absolutely normal spinal fluid, nothing out of the way in it at all, and then to find both mastoids had pus in them. The left mastoid showed a streptococcus and a pneumococcus, and the right showed a pneumococcus only.

It was a great trial to me, because I wondered if I should have operated on that boy when he had his first acute ear at Thanksgiving time; still at that time he cleared up within four days' time, he had no tenderness, no temperature, he had absolutely nothing for a month until Christmas time, and then this whole thing happened. I imagine this boy had a labyrinthitis when he became moderately deaf. I think that was the time when he started his meningitis, and it went directly from his labyrinth. Yet, at the same time, when you find a mastoid full of pus, with absolutely no reference to it at all, as we found on the right, it is difficult to decide what to do. I opened the ear on the right side because he became deaf, and I thought it would be wise to open up that ear and, if possible, get a culture from the fluid that was there.

DISCUSSION.

DR. BRAISLIN: Did he get a culture from that?

DR. LUTZ: He got a culture from that—*staphylococcus aureus*.

Did the Chair understand that it was a pneumococcus infection?

DR. LUTZ: Yes.

DR. PAGE: There was a total deafness?

DR. LUTZ: His deafness was very markedly increased. The day before he was hearing quite normally on the right side, and he became deaf to a very extreme degree.

DR. HARRIS: The Chair would like to ask Dr. Lutz what period elapsed between the relapse and the fatal termination?

DR. LUTZ: Exactly one week.

DR. HARRIS: It is an interesting question whether such a case as that would not have been a very suitable case to have looked for by an X-ray picture?

DR. LUTZ: The boy was sick in bed, and the question of an X-ray plate was suggested, but on account of his chest they did not feel there was any possibility of removing him from the house.

I would like to say that there was absolutely no suggestion or no question of the necessity for a mastoid operation until the chest became very markedly involved, and then there was only a space of one day after that before the boy became unconscious, and the possibility of doing the mastoid was still in the air when he died.

Evasion of Military Service by Pouring Acid in the Ear.

DR. PHILLIPS: At a recent meeting, during the discussion I had occasion to speak of a Russian who had come to the Post-graduate Hospital to inquire if I could do anything for his deafness, and this man, when I questioned him regarding his deafness, volunteered the information that it was caused by an act of his in persuading a doctor in Russia to pour carbolic acid in his ears in order to make him so deaf that he would be excused from military duty; and certainly there was a great destruction of the external canal, especially in the region of the drum, in that case.

Now this last week I had another Russian who consulted me for relief of pain and deafness in one of his ears; and he likewise gave me the information (he was thirty-one years of age) that at twenty-one he went to a physician in Russia, and this physician poured acid into his ear and injured the drum

to an extent so that his hearing became sufficiently defective for him to be excused from military duty.

These cases are of interest just at this time, because they bring to light the possibility of men attempting to do the same thing in connection with our draft; and I am told that there have been one or two arrests of physicians who have undertaken to bring about a physical condition in these subjects that would unfit them for military duty.

Dr. Eagleton is seeing a good many of these men, and I wondered if he had seen any of the results of attempts on the part of any of the soldiers, of the men in the draft, to evade military duty by having some attempt made to render them physically unfit? These two cases both happened to come to me and are rather interesting.

Dr. EAGLETON: I may have seen some of the effects, but they do not tell us about it.

Dr. PHILLIPS: I suppose the men have noticed in the papers that a few arrests were made of physicians who attempted to do things of this kind.

Dr. LUTZ: A year or two ago I saw a woman who had poured carbolic acid into her ear to stop a toothache and her condition was pretty serious.

Dr. PAGE: At the Manhattan Hospital last Monday one case was sent up for examination by the board that had every appearance of being one that had tried to do injury to his own drum. He claimed to have had a discharge from his ear for many years, and on looking into his ear, he had a perfectly good looking drum, no perforation that could be seen; there was an exudate from the surface of the drum membrane, which was red and swollen, and the canal was filled with a sort of a serous fluid. In testing him as a malingerer, he responded as one. I thought there was good indication that he had caused the injury purposely. He claimed total loss of hearing in the ear, and hearing was demonstrated by tests.

NEW YORK OTOLOGICAL SOCIETY.

Meeting of May 14, 1918.

Aural Neuralgia Due to Turbinate Hypertrophy.

DR. F. T. HOPKINS: I had a patient a while ago with excruciating pain in the left ear which caused her great distress, more particularly felt at the time of swallowing, but also frequently present at other times, of a neuralgic character. I had the teeth very carefully X-rayed; there was nothing to show there, but in the nostril on that side the patient had a very large lower turbinate, so that it filled up the whole nasal cavity. After various trials of one thing and another to see if it would stop the neuralgia, for the ear itself seemed perfectly normal, I cauterized the turbinate quite extensively—it extended very far back and was in a very thickened condition—and since then the neuralgia has practically subsided.

I don't know whether it is frequent or not, but I never saw an aural neuralgia due to that condition before.

Brain Stem Lesion Simulating Toxic Labyrinthitis.

DR. I. FRIESNER: I have a neurologic case which was brought to me a week or ten days ago that illustrates again the value of the functional tests in determining the site of the lesion. This young man, a dentist, was thought to be suffering from toxic labyrinthitis. His vertigo and nystagmus began about sixty hours after the ingestion of a meal in a restaurant with a friend who suffered from a gastroenteritis. He himself had no digestive disturbance. The neurologist who examined him found a disturbance of the hearing in one ear with very much diminished reaction to stimulus of the static labyrinth, and thought, at first, he was dealing with a toxic labyrinthitis.

I saw him about two weeks after the beginning of his illness. At that time his hearing was normal. I have the notes of the examination, and, with your permission, will read them.

Rinné both sides positive. Schwabach slightly shortened, both sides. The upper and lower tone limits normal. Tested

with a noise apparatus, both ears could hear low conversation readily. With the exception of the slightly shortened Schwabach, the hearing of both ears was normal.

In the examination of the static labyrinth I found the station good, with very little swaying. There was no spontaneous past pointing in the right arm, but the left arm past pointed two inches to the left. This persisted under repeated tests. There was a spontaneous nystagmus of the rotary type directed to both sides, slightly more marked to the right. There was also a vertical nystagmus upwards. Rotation to the right was followed by a horizontal nystagmus of fair amplitude lasting twelve seconds. Rotation to the left was followed by a nystagmus of very good amplitude lasting twenty-three seconds.

Testing him for vertigo, I found the following: Rotation to the right, the right arm touched; the left arm past pointed one inch to the left. That is to say, on rotation to the right, there was no past pointing of the right arm, and the left arm showed the same spontaneous past pointing that it did before rotation. In other words, as the result of stimulation, we had absolutely no vertigo. Rotation to the left, both arms past pointed two inches to the left. Despite a normal nystagmus, his past pointing was only two inches.

Caloric reaction of the right vertical canals positive, with fair nystagmus in one minute and five seconds; no past pointing either arm. This stimulation caused diplopia.

Caloric reaction of the right external (horizontal) canal slightly more marked than that of the vertical canals. No past pointing either arm.

Caloric stimulation of the right external canal arouses an oblique nystagmus upwards, a phenomenon that I have seen a number of times, and which I have called a transmutation of the nystagmus impulse. I don't know its exact significance, but I have seen it a number of times in diseases of the central nervous system with pressure on the pons.

Caloric reaction of the left vertical canals positive but faint in fifty-seven seconds. Reaction of the external canal more marked. No past pointing either arm.

Conclusions.—The hearing is normal, there is a spontaneous

nystagmus to both sides and also upwards. Functional tests indicate a brain stem lesion.

The neurologist believes this to be a case of botulism. Botulism is an infection from meat, the meat itself being tainted by the bacillus botulinus. I could not believe that such a condition with these organic changes could be toxic, particularly inasmuch as the condition lasted so long. On looking up the literature, the neurologist found that a case that had been reported from a pathologic standpoint showed multiple thrombi in the vessels in the pons and medulla. Such a change could well account for these phenomena.

Of course, this may be a case of multiple sclerosis with an unusual onset, but inasmuch as improvement is so rapid, just a matter of about three weeks now, and the man is almost well, the neurologist inclines to the diagnosis of the toxic condition.

DISCUSSION.

DR. E. B. DENCH: I would like to say that whenever we get a paradoxical reaction from the labyrinth, I mean something that is irregular, we can either put the lesion in the trunk of the nerve or in the central nerve system rather than in the end organ. Moreover, we must remember the labyrinth is a pretty small cavity, and with normal hearing any disturbance in the course of the vestibular branch must affect the vestibular center rather than the peripheral organ itself.

Now, a lot of men have not been drawing their own conclusions but have been writing by the book. Considering the fact that I have been following pretty closely the caloric, the rotation and the galvanic stimulation of the auditory nerve for the last seven years, I know that there are a great many variations which come within the normal standard, as far as time reaction is concerned, and I think everybody who has done any of this work will agree with me, that you can't say that a patient rotated in a certain direction must give nystagmus for a certain number of seconds, and in the other direction for a certain number of seconds. He will give it approximately, but you can't draw the line hard and fast. Where you can draw the line is this: In the first place, if you have a man who persistently overpoints spontaneously, you know he has some-

thing the matter with his brain stem. If you have a man who does not overpoint as the result of stimulation of his vestibular labyrinth, with a normal hearing, he has something the matter in his brain. If he hasn't normal nystagmus as a result of rotation—I mean, with normal hearing always—he has something the matter in the central nervous system. Those are facts that we can lay down pretty closely.

When it comes to the exact location of the lesion, and perhaps I have had as much experience with this as most of the men in this country, because I have been testing these cases regularly for the Neurologic Institute ever since Bárány's tests were made, I think we have a lot to learn yet. I know I have. I think the case of Dr. Friesner is very interesting. I think every point that he has made is absolutely well made.

DR. FRIESNER: I am glad to hear Dr. Dench emphasize something that has been in all of our minds, and that is this: I don't believe that any conclusions can be drawn on a purely time basis with regard to the function of the labyrinth. You must remember that you are dealing with a reflex, at least as far as the nystagmus is concerned. Now, there are many factors that enter into every reflex, simply as it appears on the surface. I don't believe that any neurologist today would put himself on record as stating that as the result of a tap of a certain strength on the quadriceps extensor tendon there must follow a kick of an exact amplitude, and that if this did not occur, therefore that reflex pathway is blocked. And I don't believe that we have any right to attempt to determine the function of the static labyrinth in that way.

There are, however, certain things that we have found with regard to location by having them recur repeatedly in similar conditions. Of course, I agree absolutely with Dr. Dench, and I take the same stand with regard to localization, that there is much that we have to learn. And yet one thing that they have shown us in Philadelphia is this: that where the external canals are active we often find in cases of disease in the central nervous system the vertical canals will not react or will not react normally. That seems to me to be the one most important contribution that they have made to the subject. I never have seen that occur in a case that is perfectly normal, and I have seen it occur in cases in which the neurologist was

doubtful as to whether there was a lesion in the central nervous system, and where eventually other signs of disease in the central nervous system have manifested themselves. There is some value in that. How much localization value there is I do not know, but there surely is some value in it.

DR. E. B. DENCH: I have tried some very interesting experiments in the New York Eye and Ear Infirmary a year and a half ago—that is, instead of letting the patient feel the finger to which he was to point, I had a table made with an isinglass or a celluloid top. In other words, the examiner's finger was put on one side, and the patient located it first with his eye and then tried to point. They will point irregularly every time unless they get the touch. That is a very curious thing, but as long as they do not touch the body, they will never find the location. We have tried that time and again. You will find even a normal individual will overpoint spontaneously a great many times, overpoint one or two inches; when he comes down to the space and actually finds the thing to go to touch he will touch it, but when he comes down to find the point that he wants to touch and touches a plain surface, he won't correct it.

DR. I. FRIESNER: That seems all the more to indicate that the deep sensibility does not play very much part in this thing. If a man will do that without being rotated—that is to say, if he will be influenced not at all by the deep sensibility, so-called, without being rotated, he certainly will not be influenced by it after he has been rotated.

Serous Meningitis.

DR. JOHN MCCOY: I saw a case in consultation with Dr. Robinson, which was rather interesting. This was a woman, thirty-two years of age, who gave a history of chronic suppuration in her left ear for fifteen years. Dr. Robinson saw her at a time that she had an acute exacerbation and operated upon her, performing a radical mastoid. At the time of doing this he exposed the dura in the middle fossa over an area of about three-eighths of an inch. She convalesced very well and left the hospital in two weeks. Two weeks after that she returned to him for dressings, and complained of severe pain through the occiput. Her temperature rose to 102½. He had

her placed in the hospital and had various tests made. He had her spinal fluid taken and it showed an increase of the cells to 230. She had no Kernig, and her Babinski was normal. The blood count made showed that the blood was practically normal.

The chief thing of which she complained was the intense headache, and the pain was so intense that morphin was necessary to relieve her. He watched her for several days, and the temperature ranged between 100 and 102½ degrees.

At the time that I saw her, which was several days after she was in the hospital, she exhibited all these symptoms, and another spinal puncture was made. The spinal fluid which, by the way, on the first was negative as to culture, showed an increase of the cells to 700. The eye grounds were negative, and at the time that I saw her she had a slight rigidity of the neck, the intense headache and a slight Babinski. I made a tentative diagnosis at the time of a serous meningitis. Dr. Robinson took her to the operating room, reexposed the wound and enlarged it. He could find no area of dead bone. He enlarged his dural exposure to the size of a little larger than a quarter. She was returned to bed, and from that time on her symptoms decreased, so that her temperature returned to normal, her cell count some five days later showed 31, and her pain within a week entirely disappeared. She made a very good recovery. So that it seems to me that it was a very clear case of serous meningitis.

Another case was that of a man, sixty-four years of age, who gave the history when I saw him that some five weeks before he had contracted a cold, which was followed by an earache. His eardrum was incised, and, as he said, his ear ran for two weeks and then dried up. During that time he was seen by a general practitioner, and for three weeks subsequent to the cessation of the discharge, and at that time he complained of this dull pain over the side of his head. His temperature was normal. He walked to my office. On looking into his ear, the drum was thickened but not bulging, the mastoid was tender, especially over the tip, and I had an X-ray plate made of his mastoid which showed an abscess in the mastoid with a breaking down of the bony substance. I operated on him the next day and found a very extensive

abscess in the mastoid. The entire inner plate was gone, the dura over the sinus and below the sinus and behind the sinus was covered with granulations, and the external semicircular canal had a fistula in it.

He had given no symptoms whatever of interference with his labyrinth, never the slightest disturbance. As I say, he walked into my office, and so I decided to let his labyrinth alone. The wound was redressed on the third day; his temperature remained normal, about $99\frac{1}{2}$, and at that time he told me that his hearing had improved since the operation—he could hear better. He was dressed again on the fourth day. The wound looked perfectly normal. On the fifth day his temperature shot to 105. He developed rapidly all the signs of meningitis, and on the sixth day he passed out. On the fifth day I took him to the operating room, reopened the entire wound and could find absolutely no pocket, found everything in the wound perfectly healthy looking. I purposely opened his sinus. I thought possibly he might have had a clot in his sinus, but the sinus bled freely from both ends.

The question in my mind was, Did he develop his meningitis through his labyrinth without giving symptoms, or had it passed through the dura and developed a localized meningitis which on the fifth day spread and became general and overwhelmed him?

DISCUSSION.

DR. E. B. DENCH: For the last fifteen years I have been trying to teach men that if they expose a small area of dura they should always expose a large area. In other words, a small area of dura exposed at the time of the mastoid operation or at the time of the radical operation, either intentionally or accidentally, is, to a certain extent, a dangerous accident or a dangerous necessity. An exposure of a very large area of dura is frequently of great advantage to the patient in the radical operation. If a small area of dura is exposed, either accidentally or by design, usually accidentally, in the course of an operation for acute mastoiditis, then the large area must be exposed, for the reason that with a small area exposed you must have a certain amount of traumatism to the dura. I mean when any dura is exposed you must have a certain

amount of traumatism owing to the sponging and the necessary passage of instruments over the exposed dura. Now, you are going to get a certain amount of swelling of dura at that point. If the small area is exposed, the nutrient vessels surrounding the larger veins of the dura are not going to be able to carry away the infection. Consequently, as the result of swelling of the dura and the bone lying close to it, you have a certain amount of stasis of the blood there, and any infectious material there is carried directly through the vessel of the dura to the pia and to the arachnoid, and you get a general meningitis.

Then one other point which that first case of Dr. McCoy's brings out very prominently, and that is this, that in spite of all the experiments which have been made on animals, we are taught that the dura is a perfectly inelastic membrane; that we have absolutely no decompression results from an exposure of a large area of dura, provided the dura itself is not divided. This is absolutely false, as far as clinical facts are concerned, and I have reported a number of cases similar to this one which Dr. McCoy reports. A lot of such cases are reported in literature by independent observers without the particular fact in mind, but we do know clinically that given a case of meningitis—that is, a case with symptoms of meningitis, a stiff neck, a high temperature, a positive Kernig, sometimes a Babinski, sometimes not. The cell count in all these cases is high. I remember one case that was brought into St. Luke's with a cell count of 2,400, and all we did was exactly what Dr. Robinson did in this case after consultation with Dr. McCoy, only instead of exposing an area of dura the size of a quarter, my associate, Dr. Bowers, at my suggestion, exposed an area much larger than that—that is, taking away the entire tympanic roof, doing practically a subtemporal exposure, but not dividing the dura. Subsequently the temperature fell and the cell count gradually diminished and that boy got well. That is not one case, but we have a lot of them.

The point that I would like to emphasize is this: First, whenever you expose a small area of dura, for heaven's sake expose an area not as big as a quarter but an area as big as a half dollar. Of course, this depends upon the age of the patient and a great deal upon the particular conformation of the parts

in the particular case. If you have a big mastoid, expose an area three-quarters of an inch in diameter anyway, and you will find that your accidents, as far as meningitis is concerned, after an operation of this kind, will be absolutely nil. The exposure of a large area does no damage. The exposure of a small area is a pretty dangerous thing.

DR. W. C. PHILLIPS: I would like to know whether the patient had hearing before the operation.

DR. MCCOY: Yes.

DR. PHILLIPS: With the noise apparatus?

DR. MCCOY: Yes.

DR. E. B. DENCH: We are talking in the family now. Two things that I always have done on every case where I am going to do an operation of this kind—I always have a caloric test made before the operation, and I always have a spinal puncture made before the operation, because I know that some of my early cases died of meningitis which they already had before I operated.

DR. PHILLIPS: Do you mean to say that you have a spinal puncture made before every case of radical operation?

DR. DENCH: Yes, I have every case that goes into the ward given a spinal puncture and most of the private cases. I make an exception of some of the private cases, but every case that goes into the ward, as a routine procedure, at St. Luke's, and most of them at the Infirmary, has a spinal puncture made before being put on the table. I know the reaction of that labyrinth before they are put on the table, and it is surprising what you learn by just those two simple things.

DR. T. P. BERENS: I would like to ask Dr. Dench whether in a case of acute simple mastoiditis in a private patient he does a spinal puncture

DR. DENCH: A great many times I do; sometimes I don't.

DR. BERENS: Why don't you?

DR. DENCH: Simply because sometimes the patient objects to it.

DR. BERENS: I started that procedure. I had a series of cases like Dr. McCoy's two or three years ago. I published them, cases of latent meningitis without any symptoms of central nervous involvement at all until immediately before death. None of those cases had a fistula; they were all care-

fully taken care of at the time of the operation; they were all carefully tested. Their hearing was taken, their functional examinations, and their static labyrinths were examined. Still those cases died of meningitis in a very few hours—I don't mean twelve hours, but I mean five or six or seven hours.

One man was over at the park that afternoon, walked there and back, and we found at postmortem great chunks of almost solid pus over and in the brain and cord. Don't you remember I reported those two or three years ago? At that time I started in my clinic an order to use a spinal puncture on every patient.

DR. DENCH: I think the more of those we do the more we learn.

DR. BERENS: It is very interesting to hear you say, Dr. Dench, that you can control your private patients to that extent.

DR. W. C. PHILLIPS: I have never thought it necessary to make all labyrinthine tests in simple mastoids, and I do not do it in all cases of the radical. But in every radical case I make sure whether the patient has hearing in the affected ear. If the patient has hearing and has never given any history of vertigo or nausea or any other symptom that might indicate that there was an involvement of the labyrinth, then I do not always go through the complete test.

Two days ago I operated on a young woman who still had hearing. I mention this more because it emphasizes the one point that Dr. Dench has made. It was a chronic suppuration of five years' standing, with several acute attacks, and an acute attack at the time I operated, and with a high temperature. It was impossible to remove the diseased portion of the tegmen without exposing the dura. It had to be done even in this chronic case, but the acute exacerbation revealed such an enormous area of diseased bone that I could not possibly get rid of the disease without exposing the dura. After a small exposure of the dura, every bit of the tegmen was taken off, and I made a very wide exposure of the dura, as I always do. If any dura is exposed, let it be a large area of dura, in order that drainage may be adequate.

DR. T. P. BERENS: I would just like to add one little thing, and that is in regard to Dr. McCoy's second case. Dr. McCoy

has my greatest and deepest sympathy. I believe he did everything necessary according to the book. These cases will sometimes develop. I have often thought that there may be a localized meningitis that bursts and spreads like that, but I cannot understand how this meningitis can be so extensive as to spread all over the brain and way down into the spinal canal so quickly as to have the patients come in off the street and in two or three hours be dead.

DR. W. C. PHILLIPS: There is one point in Dr. McCoy's second case that it does not seem to me has been mentioned that I believe to him is important. I gather that Dr. McCoy would like to know whether, with a case that gives the history that he had, and he found a fistula of the horizontal semicircular canal, the subsequent history being a death by meningitis, he ought to have performed the labyrinthal operation.

DR. DENCH: You should have tested the labyrinth, of course, as well as the hearing.

DR. PHILLIPS: He tested the hearing, and the patient had hearing.

DR. DENCH: That doesn't mean anything.

DR. MCCOY: That is one of the reasons for presenting the case.

DR. DENCH: I understood that the labyrinth was active. Of course, you would naturally test the caloric reaction.

DR. A. B. DUEL: I cannot see how the infection of the meninges in the second case occurred by way of the labyrinth. If this man had hearing it certainly indicated that he did not have a dead labyrinth.

If the infection had extended rapidly through the labyrinth as a result of traumatism or otherwise, he would have lost his hearing before he showed signs of meningitis.

DR. W. C. PHILLIPS: It is quite likely that if he died as the result of meningitis via the labyrinth he lost his hearing before he became unconscious. Now, the question that the Chair would like to raise is this: We know Dr. McCoy's patient had a fistula, and we know he could hear. Supposing in addition to that the caloric test or the rotation test had shown that the static labyrinth was dead and the man had no temperature, would he have been justified in doing a labyrinth operation on that case?

DR. DENCH: No.

DR. PHILLIPS: I don't think so either.

DR. I. FRIESNER: Has anyone ever seen such a case with a totally destroyed static labyrinth and hearing present?

DR. PHILLIPS: I think we had one case.

DR. FRIESNER: Not as the result of suppuration.

DR. J. D. RICHARDS: Unfortunately, I had to go out and I didn't hear what degree of hearing was reported, but to get good hearing in a suppurative labyrinth is a very rare proposition. Now, as to the direction in which the infection spreads and its rate of travel: The most salient point in determining this is to make frequent and repeated tests for hearing in the involved ear. By comparison of these tests we may often gain a very accurate idea of the march of the disease and its rate of travel.

DR. PHILLIPS: I had an experience that beautifully demonstrated the statements that Dr. Richards has made. It was in a patient where an osculectomy was done. That patient, after forty-eight hours, had a chill and vomiting and an attack of vertigo and a rise of temperature to 103 or 104 degrees. Dr. Held saw the patient several hours later. I think this chill occurred in the morning or the night before, and along in the afternoon Dr. Held made a very careful examination of this patient with a noise apparatus, and he had hearing in that ear, but it was very much diminished. He had no nystagmus.

This examination was at 6 o'clock in the evening, and about 9 or 9:30 that same night I saw the patient and tested him with a noise apparatus. His hearing was gone, and he was in a very bad way. He then had a spontaneous nystagmus to the other side, all occurring within a few hours.

That illustrates the point that Dr. Richards has made. With a suppurating labyrinth, which this man no doubt had, he gradually lost the hearing, and there was no question as to the pathway of the infection in that case, because it must have been through the labyrinth.

DR. DENCH: You say the patient was unconscious when you examined him?

DR. PHILLIPS: I said he was rapidly approaching that state. He was slightly somnolent. He was able to give me a positive

demonstration that he couldn't hear at that time, but within twelve or fifteen hours afterwards he died.

DR. J. R. PAGE: In reference to this case—did anyone ever see an invasion pass to the meninges through the labyrinth without a loss of equilibrium or a typical labyrinthine disturbance? As I understand it, it was an acute mastoid, or could be called an acute mastoid with a duration of only three weeks?

DR. MCCOY: It ran for three weeks, stopped and then started again.

DR. E. B. DENCH: Just exactly the point that Dr. Page brought up, and that is that you do not get a fistula in a horizontal canal in five weeks.

We have here brought up the very large subject, I think, of recurrent otitis. A patient will have repeated attacks of acute otitis, not severe enough to give acute mastoid symptoms, or if they do give mastoid symptoms they clear up. It has been the experience of every man who has operated a great deal that you frequently go into a mastoid with a five days' history, so-called, and you find a tremendous lot of destruction. That did not occur in five days. That patient in past years has had mild attacks of middle ear inflammation which have cleared up. He may not have given the history. They forget it. How many patients come into your office with an ear that you find is a chronic ear? They give no history of discharge.

You see a lot of cases coming in with a crust on the posterior wall of the canal covering a perforation. The man says that ear has never discharged. You know that his ear has discharged in childhood. The history that the patient gives in regard to preceding attacks, if they have been mild, does not amount to anything. I think that is exactly what we had here. I think that is a very important point that Dr. Page brought out here, that five weeks do not constitute a history.

DR. T. P. BERENS: I would like to ask Dr. McCoy whether he didn't state that that was an acute middle ear in which the discharge had dried up, and the man had never had any trouble with his ear before, had never had an earache before, had never had a discharge or anything or that sort?

I protest that repeated attacks of earache are remembered by the patients. I remember but one earache I have ever had.

I was seven years old and have never forgotten it. I have seen a fistula of the external semicircular canal in an acute mastoid with a perfectly normal drum membrane, as normal a drum membrane as you could find, with a little bulging in the posterior superior triangle. I saw that patient on the table, and there was a fistula there of the external semicircular canal. Of course, that might have been an anomaly.

DR. A. B. DUEL: Dr. McCoy's records show that the hearing was decidedly improved following the operation, and that twenty-four hours later the patient developed meningitis. There was no evidence of loss of hearing following the operation. If, in that twenty-four hours there had been demonstrated a very marked or complete loss of hearing, the evidence would be overwhelming that the meningeal infection had occurred by way of the labyrinth; but with a large epidural abscess such as he has described there is more probability that the meningitis might have been provoked by some traumatism to the granulations which were the protecting agent for the dura.

The greatest danger that I can imagine is incurred by removal in any way of the protecting granulations over a large epidural abscess. My practice for many years in these cases has been to remove the overlying bone, with the greatest care, to normal appearing dura around the area of granulation, and to interfere with them in no other way other than by careful cleansing with hydrogen peroxid and repeated washing with normal salt solution.

DR. W. C. PHILLIPS: Regarding the question of the rapidity with which a fistula, a breaking down of what we know to be naturally a very dense, hard, bony structure, may occur, I should like to suggest that a fistula would far more easily develop in a case of tuberculosis.

We must remember that there are certain individuals that for various reasons have nonresisting tissues, and I can imagine how a fistula might form in a much shorter period in some of these patients than under ordinary conditions.

DR. DENCH: Might I ask Dr. Duel how many cases of epidural abscess he has seen develop meningitis?

DR. A. B. DUEL: In my earlier years I saw some cases in which the enthusiasm of the operators led them to scrape the

granulations down to the dura. I can't say how many, but I have seen a few cases in which I was perfectly certain that the traumatism to those protecting granulations has caused the death of the patient.

DR. MCCOY: I would like to thank the members for their full and free discussion. It has been a very interesting one. The thing, as I revolved it over in my mind, was, in the first place, the question of whether if I should see a case of that kind again, would I open the labyrinth or would I not, and from the discussion here tonight I am still on the fence.

Here is a man with an acute suppuration of the middle ear. He was a healthy man, sixty-four years of age. I inquired particularly of his past history, as to any other attacks, and he never had had any ear trouble in his life before that. He never had complained of dizziness of any kind. He never gave any symptom to lead me to think that his labyrinth was involved. The thing that occurred to me was that it would perhaps be wise for us to make tests of the labyrinth, in view of this possibly very rare contingency, for us to be able to definitely say that that semicircular canal system was or was not functioning before the operation. Certainly there did not seem to me at the time to be any question as to why I should test his labyrinth. It was an acute suppuration. Of course, the fact that pus lay on the dura there for three weeks without a drain gave me sufficient evidence to believe that his infection had gone through his meninges, that he had established a localized meningitis, which suddenly spread and rapidly produced death.

Pneumococcemia With Ear Involvement.

DR. E. B. DENCH: I haven't very much to report. There is one rather interesting case which occurred to me that came under my observation at St. Luke's several weeks ago.

A young woman, practically two months before she came into the hospital, gave a history of an attack of grip, with an otitis in both ears, more marked on the right side. She had had severe pain, and I think she had had some discharge from the right ear. She came into the hospital with pain in the right ear and a very curious looking canal—that is, she had a typical sinking of the upper and posterior wall of the

canal and a drum membrane that was cloudy and partly concealed by the upper and posterior portion. An incision was made. Very little pus was evacuated. The radiogram was slightly cloudy.

From the appearance of the fundus on the right side and the questionable appearance of the X-ray picture, I opened her right mastoid. The cell walls were some of them broken down. There were granulations in the mastoid, but at the same time there was not the extensive destruction which I am frank to say I rather expected to find. The sinus was exposed during the operation. The sinus was perfectly normal. The dura was exposed in the middle fossa by disease—that is, the softened bone ran down so that I was obliged to expose the dura, and I exposed a large area. The patient did very well, except that she ran a little temperature, but her temperature became normal the third day.

On about the sixth or seventh day after the operation, she developed a very mild acute otitis in the left ear, and coincident to this there was a temperature jump. The ear was incised, the temperature fell and then rose again. The blood culture was negative, and the wound doing perfectly well on the operated side, the second ear draining perfectly well, the **fundus looking** as if the ear was going to clear up.

The temperature remained between 102 and 103½ for four or five days. Then she developed tenderness in the right iliac fossa and her appendix felt sore. They thought she had an **appendicitis** and they took out a normal appendix. Finally, **they got a positive pneumococcus culture** from her blood. At the time of the appendicitis operation the peritoneal cavity had a slight amount of fluid, and the peritoneum was somewhat congested. In other words, here was a case that was suffering from a general pneumococcus infection. She developed a pneumococcus peritonitis, which accounted for the rise in temperature. Possibly the starting point was the ear, but I think probably the development of the ear trouble was entirely secondary to a general pneumococcus infection.

It simply goes to show that if I had been too radical there, I would have taken out her internal jugular vein on the right side, thinking that she had had a sinus.

That girl is entirely well at the present time. It is just a rather interesting case of a general pneumococcemia involving first both ears, then the right mastoid, secondarily the left middle ear, then the peritoneal cavity.

Suspected Sinus Thrombosis.

DR. ROBERT LEWIS reported a case.

DISCUSSION.

DR. DENCH: I saw a case in consultation in a neighboring city a couple of weeks ago in which the child had been operated on for acute mastoiditis on the fifth day after the ear became involved, and the child had a rise in temperature to 105, the wound looking pretty well.

This case followed measles, and I said I did not think that the sinus was involved. The next day the temperature went to 104, any they were very anxious to have something done. I still refused, and the next day the temperature was not quite so high, but they brought the child to New York. The child, as soon as it was under systematic observation, showed that it had a colitis. The colon was washed out, and the child made a perfect recovery.

I think that there are a lot of these cases that are younger men get rather nervous about, and they are inclined to operate too soon. I think that Dr. Lewis' case is particularly interesting because he did refrain from operating—that is, I think that most of you have seen a lot of these cases and practically know when it is a sinus thrombosis. He simply showed his good sense by waiting.

Where you do cure a sinus thrombosis it gets well so quickly that the results are simply astonishing, and moreover, where they go badly, nothing can save them at the end. I think many of the very young men are perhaps too conscientious and they take out their jugular very early. I think in a case of this kind, where you have a moderate rise in temperature and are in doubt, it is very valuable to report the case.

DR. J. D. RICHARDS: I should simply like to mention a phenomenon I have had occasion to observe in three cases of sinus thrombosis. I will simply mention one case which will illustrate the three.

An infected thrombus extended throughout the entire verti-

cal limb, throughout the major portion of the lateral sinus. In dressing the case and packing the torcular end of the sinus the patient complained of exquisite pain in the eye. The interior of the sinus was cocainized with a 20 per cent solution, and the faintest touch with the cotton application would cause her to raise her hand to her eye and complain of exquisite pain. I have seen that occur in three cases. The face was covered in this particular patient so that she had no idea when I was touching the interior of the sinus, and I thought it might be interesting to mention it simply as a phenomenon.

DR. DENCH: The torcular end?

DR. RICHARDS: Within two inches of the torcular end.

Simple Mastoid Operation Followed by Meningitis.

DR. J. R. PAGE: I wish to report the case of a boy, ten years of age, who had had a mastoid performed on his right ear two years ago. I saw him eight days after an earache started in his left ear, and he then had a temperature of 103 by mouth. I operated on him that night. He had a frank mastoiditis with mastoid filled with fluid pus throughout, and cells that were deep down and behind his facial nerve.

There was no exposure of his nerve, but the day after the operation, at 9 o'clock in the morning, his temperature was 103. However, he felt very much more comfortable. He did not have the headache that he had before. On the third day after his operation he showed a slight paresis of the muscles of the face on the operated side. Two days after this there was complete paralysis of the face on that side. That was about the fifth day. After the second day, he began to complain more of headache. He vomited the first day after his mastoid, but that was due probably to some acidosis, as acetone was found in his urine. After giving him some bicarbonate of soda the acetone disappeared, and he did not vomit any more until the fifth day. Then he vomited twice.

His temperature had not been above $101\frac{1}{2}$, but at 6 o'clock in the morning on the seventh day he had a temperature of 102.6. At 9 o'clock his temperature, I think, was around 103 or 104. He talked to the nurse and said what he wanted to have for breakfast, etc.

I called on him at about 10 o'clock, and he was sitting up

in bed. He had been sitting up in bed ever since the third day after the operation and turning around any way he wanted to. When I entered the room he called to me, and shouted in a very loud voice, "Good morning, doctor; I can't hear anything. I have a terrible noise in my right ear and I can't hear anything." You could easily tell by the sound of his voice that he could not hear his own voice. Yet he was sitting up in bed during this time.

I had Dr. Duel see him that day. We had a lumbar puncture done which showed cloudy fluid but was negative on culture and negative on smear. His leucocytes then were 40,000, 90 per cent polynuclear. He was practically totally deaf. He had had a marked attack of vomiting that morning. He had vomited probably once a day for two or three days prior to that, I think. But he was cheerful and had no evident nystagmus.

On the seventh day, at 6 o'clock in the morning, he vomited; at 7 or 7:30 in the morning he vomited; at 9 o'clock he vomited.

When he greeted me in this way in the morning, I asked the nurse how long he had been deaf, and she replied she had only just noticed it; a short time before, he had heard well.

I dressed his ear, and he remarked that he could hear better with the dressing off his ear. I shouted close to his ear, and he could distinguish one or two words in a very loud voice in the operated ear. With a noise apparatus to that ear he could not hear anything. He could not tell the difference between a loud shout and a loud whistle in the right ear.

He died on the tenth day from meningitis. He was perfectly conscious almost to the very end, up to the day he died. The night before he died he became irrational at times. He complained of severe headache after the seventh day and died on the tenth day.

Now, at the operation the boy had an exposure of dura over his middle fossa, over his attic and antrum, a wide exposure of dura, and also his sinus was exposed. At the dressing on the seventh day the sinus had a grayish appearance, the granulations had not covered his sinus. With that rise of temperature to 104, it occurred to me that he might be getting some absorption through that wall. What I want to be en-

lightened on is: Was this loss of hearing in both ears due to an invasion of his labyrinth without any disturbance of his equilibrium, without any evident nystagmus? The first thing I thought of was a labyrinthitis, because of his roaring tinnitus, his sudden loss of hearing and his pronounced vomiting that occurred on the seventh day. Then, after thinking it over, I remembered that the second day after his operation you could not keep him still. He would sit up in bed and turn his head in various directions. He continued to do that right up almost until the day before he died. He was sitting up in bed when he called to me that he could not hear.

DR. DENCH: Do I understand that he was deaf in both ears?

DR. PAGE: Both ears. My attention was not called to any deafness whatever. It was a simple mastoid operation with fair hearing. I did not test his labyrinth. I operated on him the night I saw him. He had a temperature of 103, terrific headache, pus pouring out of his ear, a marked sagging of his posterior canal wall, a very profuse discharge, a very severe headache—so much so that he was complaining of terrific pain in his head. He was operated on within three hours after he was seen by me. The third day he showed a beginning facial paralysis on the operated side. Now, was the invasion of his meninges along his facial nerve without any labyrinthine disturbance?

DR. RICHARDS: Was the opposite ear a perfectly normal ear?

DR. PAGE: A perfectly normal ear. I had not tested his hearing. You see, this thing occurred suddenly on the seventh day. The first dressing was done on the third day under nitro-oxid, because he was a very frail, sensitive boy. On the fourth day there was a good deal of purulent secretion in the wound, and tube was put in and Dakin's solution instilled every little while. The next day it was discontinued because the purulent secretion had cleared up very promptly.

DR. MCCOY: There was no involvement of the other cranial nerves?

DR. PAGE: No.

DR. DUEL: I have a feeling that the invasion had gone from his meninges to the labyrinth.

DR. DENCH: That is what I think.

INDEX OF THE LITERATURE.

SECTION 1.—LARYNGOLOGY AND OTOTOLOGY— GENERAL AND HISTORICAL.

Britton, J. M. The relations of the dental, oral and nasal surgeons.

Dental Summary, Toledo, 1918—XXXVIII—880.

Brose, L. D. Pneumococcus infection, eye, ear, nose, throat.

South. M. J., Birmingham, 1918—XI—701.

Cohen, Solis J. Early laryngology in Philadelphia.

Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—862.

Dufourmental, L. Otorhinolaryngology in 1918.

Paris méd., 1918—VIII—190.

Lyster, Theodore C. The aviation service of the Medical Department of the Army.

Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—851.

Mosher, Harris P. Otolaryngology in the first year of the war. An informal report.

J. Am. M. Ass., Chicago, 1918—LXXI—1872.

Pierce, Norval H. Otolaryngology in the Army Medical Service.

Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—856.

Rowland, W. D. Some ear, nose and throat remedies and how to use them.

J. Am. Inst. Homeop., Chicago, 1918—XI—541.

Thoma, K. H. Dental diseases in relation to diseases of the nose and throat.

Brit. M. J., 1918—CLXXIX—17.

Viton, A. Order of examination of respiratory apparatus.
Semana méd., Buenos Aires, 1918—XXV—670.

Wright, J. W. Conservation in radical surgery of the nose and throat.
The Laryngoscope, St. Louis, 1918—XXVIII—705.

SECTION 2.—RESPIRATORY SYSTEM, EXCLUSIVE OF THE EAR, NOSE AND THROAT.

Abt, I. A. Asthma in children.
Med. Clin., Phila., 1918—I—1425.

Beals, Lynn S., Zimmermann, B. J., and Marlowe, S. B. Acute respiratory diseases among troops, with special reference to empyema.
J. Infect. Dis., Chicago, 1918—XXIII—475.

Bensuade, R., and Hallion, L. The use of adrenalin and pituitrin in asthma.
Presse méd., Par., 1918—XXVI—185.

de Besche, A. A study of constitutional supersensitiveness and bronchial asthma.
Norsk mag. f. laegevidensk. Kristiania, 1918—LXXXIX—343.

Freudenthal, W. The pathogenesis of bronchial asthma.
Laryngoscope, St. Louis, 1918—XXVIII—781.

Hutchison, J. M., and Budd, S. W. A vaccine for the treatment of bronchial asthma. Report of twenty cases.
Am. J. M. Sc., Phila., 1918—CLV—826.

de Kleyn, A., and van Leuwen, W. S. Uric acid metabolism in asthma and rhinitis.
Nederl. Tijdschr. v. Geneesk., Amsterdam, 1918—II—68.

Maude, A. Influenza and purulent bronchitis.
Lancet, London, 1918—II—324.

Rackemann, F. M. A clinical study of 150 cases of bronchial asthma.
Boston M. & S. J., 1918—CLXXVIII—770.

Rockemann, Francis M. A clinical study of one hundred and fifty cases of bronchial asthma.

Arch. Int. Med., Chicago, 1918—XXII—517.

Spolverini, L. M. Asthma in children.

Pediatrics, Napoli, 1918—XXVI—569.

Turnbull, J. A. Anaphylaxis in connection with asthma. Hay fever and various skin diseases.

Dental Cosmos, Phila., 1918—LX—1112.

Walker, I. Chandler. The treatment of bronchial asthma with proteins.

Arch. Int. Med., Chicago, 1918—XXII—466.

SECTION 3.—ACUTE GENERAL INFECTIONS, INCLUDING DIPHTHERIA, SCARLET FEVER, AND MEASLES.

Aronson, J. D., and Friedberg, S. A. Demonstration of diplococcus meningitis in the adenoid tissue of the nasopharynx.

Med. Rec., N. Y., 1918—XCIV—1017; also,

Mil. Surgeon, 1918—XLIII—552.

Averill, C., Young, G., and Griffiths, J. Influenza epidemic in camp.

Brit. M. J., London, 1918—II—111.

Beals, Lynn S., Zimmermann, B. J., and Marlowe, S. B. Acute respiratory diseases among troops, with special reference to empyema.

J. Infect. Dis., Chicago, 1918—XXIII—475.

Blue, Rupert. "Spanish influenza," "three day fever," the flu.

West. M. Rev., 1918—XXIII—541.

Cannata, S. Diphtheria bacilli carriers.

Pediatrics Napoli, 1918—XXVI—414.

Dieffenbach. Spanish influenza.

J. Am. Inst. Homeop., Chicago, 1918—XI—406.

- Glaus, A., and Fritzsche.** Neoropsy findings in influenza.
Cor. Bl. f. schweiz. aerzte, 1918—XLVIII—1121.
- Hewlett, A. W.** Influenza at a Navy Base Hospital in France.
J. Am. M. Ass., Chicago, 1918—LXXI—1056.
- Holinger, J.** The Spanish grippe in Switzerland.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—968.
- Irons, E. E.** A recent epidemic of acute respiratory infection at Camp Custer, Mich.
J. Am. M. Ass., Chicago, 1918—LXXI—1988.
- Keegan, J. J.** The prevailing pandemic of influenza.
J. Am. M. Ass., Chicago, 1918—LXXI—1051.
- Kelly, T. H.** Management of epidemic of diphtheria.
Practitioner, London, 1918—CI—110.
- King, W. R.** The influenza in the East.
J.-Lancet, Minneapolis, 1918—XXXVIII—596.
- Kloosterman, H. J.** Spanish influenza.
Nederl. Tijdschr. v. Geneesk., Amst., 1918—II—256.
- Lathrope, G. H.** Acute mastoiditis as a complication of infectious diseases, based on a study of 123 cases in the base hospital at Camp Shelby, Miss.
J. Am. M. Ass., Chicago, 1918—LXXI—451.
- Lynah, H. L.** The treatment of stenosis of the larynx and trachea following diphtheria.
Laryngoscope, St. Louis, 1918—XXVIII—629.
- Mackenzie, G. W.** Nasal complications of epidemic influenza.
N. York M. J., 1918—CVIII—885.
- Maude, A.** Influenza and purulent bronchitis.
Lancet, London, 1918—II—324.
- Nichols, H. J., and Bryan, J. H.** The tonsils as foci of infection in streptococcus hemolyticus carriers.
J. Am. M. Ass., Chicago, 1918—LXXI—1813.

- Pelfort, C.** Tuberculous meningitis after mumps meningitis.
Rev. d. clin. ped., Florence, 1918—XVI—232.
- Prada.** Influence of acute infections on the hearing.
Prog. de la clin., Madrid, 1918—VI—31.
- Puyol, A. F.** Diphtheria in three days' child.
Arch. latino Am. de pediat., Buenos Aires, 1918—XII—21.
- Renault, J.** Influenza in Switzerland.
Bul. d. l'acad. de méd., Paris, 1918—LXXX—153.
- Schelperoort, W.** Scarlatinal ethmoiditis; three cases.
Nederl. tijd. Geneesk., Amst., 1918—II—522.
- Schoenemann, A.** Powder treatment of the nose in prophylaxis of influenza.
Cor. Bl. schweiz. aertze, Basel, 1918—XLVIII—1125.
- Von Tiling, J. H. M. A.** Influenza and suprarenal glands.
N. York M. J., 1918—CVIII—895.
- Voorhees, I. W.** The successful treatment of chronic pathogenic infections of the lower respiratory tract.
N. York M. J., 1918—CVIII—189.
- Weaver, G. H.** Further experience with face masks.
J. Am. M. Ass., Chicago, 1918—LXXI—1405.
- Wirgman, C. W.** An "influenza outbreak."
Lancet, London, 1918—CXC—324.

SECTION 4.—SYPHILIS.

- Bellin and Vernet.** Syphilis of the pharynx.
Par. méd., 1918—VIII—205.
- Culbert, W. L.** Multiple osteoma of the nasal accessory sinuses. Report of a case complicated by syphilis.
N. Y. State J. M., 1918—XVIII—465.
- Torres, L.** Syphilitic facial diplegia.
Ann. Paul. de méd. e cir., S. Paulo, 1918—IX—89.

- Zentler, A.** Syphilitic lesions of the mouth.
J. Ass. Mil. Dental Surg., San Fran., 1918—II—125.

SECTION 5.—TUBERCULOSIS.

- Grazzi, V.** Present status of laryngeal tuberculosis.
Riforma méd., Napoli, 1918—XXXIV—686.
- Oertel, T. E., and Griot, G. A.** Report of a case of primary tuberculosis of faucial tonsils.
J. Am. M. Ass., Chicago, 1918—LXXI—968.
- Robertson, C. A.** Laryngeal tuberculosis, its early recognition and curative treatment.
J. Tenn. M. Ass., Nashville, 1918—XI—60.
- Robinson, Beverley.** Tuberculous glands of the neck in young girls.
Am. Med., N. Y., 1918—XIII—599.
- Winslow, P. V.** A few things about laryngeal tuberculosis.
Long Island M. J., Brooklyn, 1918—XII—138.

SECTION 6.—ANATOMY, PHYSIOLOGY AND PATHOLOGY.

- Atwell, W. J.** The development of the hypophysis of the anura.
Anat. Rec., Phila., 1918—XV—73.
- Atwell, Wayne L.** The development of the hypophysis cerebri of the rabbit.
Am. J. Anat., Phila., 1918—XXII—271.
- Beck, Joseph C.** Surgical pathology of the mastoid.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—869.
- Bigelow, F. Nolton.** Types of mastoid structure with special reference to their differentiation by means of stereoradiography.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—887.
- Davis, Warren B.** Anatomy of the nasal accessory sinuses in infancy and childhood.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—940.

- Ewing, John.** Military aspect of status lymphaticus.
J. Am. M. Ass., Chicago, 1918—LXXI—1525.
- Freudenthal, W.** The pathogenesis of bronchial asthma.
Laryngoscope, St. Louis, 1918—XXVIII—781.
- Garraghan, Edward F.** Status thymus lymphaticus.
Illinois M. J., Chicago, 1918—XXXIV—189.
- Key, Sam.** An elongated styloid process.
Laryngoscope, St. Louis, 1918—XXVIII—849.

SECTION 7.—EXTERNAL NOSE.

- Banister, J. M.** The correction of nasal deformities by the transplantation of bone.
Nebraska M. J., Norfolk, 1918—III—201.
- Cohn, Lee.** The necessity for prompt management of fracture of the nose.
Mil. Surgeon, 1918—XLIII—506.
- Guisez.** Reconstruction after war wound of nose.
Paris méd., 1918—VIII—198.
- Stanley, L. L.** Nasal refracture.
Surg., Gynec. and Obst., Chicago, 1918—XXVII—609.
- Winslow, J. R.** Report of some cases, mostly traumatic, of serious damage to the nose and accessory sinuses, operated upon externally with excellent cosmetic results.
Laryngoscope, St. Louis, 1918—XXVIII—679.

SECTION 8.—NASAL CAVITIES.

- Alonzo, J. M.** Autoplastics for stenosis of the nose.
Rev. med. del. Uruguay, Montevideo, 1918—XXI—514.
- Bell, George Huston.** Report of a case of bilateral papilledema due to empyema of sphenoid and ethmoid sinuses. Operation and recovery.
Arch. Ophthal., N. Y., 1918—XLII—344.

- Britton, J. M.** The relations of the dental, oral and nasal surgeons.
Dental Summary, Toledo, 1918—XXXVIII—880.
- Brose, L. D.** Pneumococcus infection, eye, ear, nose, throat.
South. M. J., Birmingham, 1918—XI—701.
- Cohn, Lee.** The necessity for prompt management of fracture of the nose.
Mil. Surgeon, 1918—XLIII—506.
- Delavan, D. B.** The value of dichloramin-T chlorosane solution (Dakin-Dunham) in the treatment of infections of the upper air passages.
Med. Rec., N. Y., 1918—XCIV—89; also,
Am. J. Surg., N. York, 1918—XXXII—306.
- Dennett, D. C.** Treatment of colds.
Bost. M. and S. J., 1918—CLXXIX—41.
- Dowling, J. T.** The relation of the development of the nasal fossa to that of the oral cavity.
Internat. J. Orthodontia, St. Louis, 1918—IV—355.
- Eves, C. C.** The present status of hay fever treatment.
Penn. M. J., Athens, 1918—XXI—617.
- Gradenigo, G.** Technic for douching nose.
Riforma méd., Napoli, 1918—XXXIV—616.
- Guisez.** Reconstruction after war wound of nose.
Paris méd., 1918—VIII—198.
- Guthrie, J. M.** The relation of nasal and oral sepsis to systemic disease and surgical conditions resulting from focal infections.
Dental Cosmos, Phila., 1918—LX—963.
- Harry, P. A.** Calcium lactate in nasal surgery.
Prescriber, Edin., 1918—XII—117.
- Hayes, Harold.** Treatment of dry catarrh of the nose.
Med. Times, N. Y., 1918—XLVI—260.

- Hill, W., and Patterson, N.** Discussion on "the influence of diseases and abnormalities of the nose on the ear."
Proc. Roy. Soc. Med., Lond., 1918—XI—Sect. Otol., 25.
- Hurd, L. M.** Adenocarcinoma of the nose. Report of four cases.
Laryngoscope, St. Louis, 1918—XXVIII—757.
- de Kleyn, A., and van Leuwen, W. S.** Uric acid metabolism in asthma and rhinitis.
Nederl. Tijdschr. v. Geneesk., Amsterdam, 1918—II—68.
- Leegaard, F.** Retronasal tumors.
Norsk. mag. f. Laegevidensk., Kristiania, 1918—LXXIX—617.
- Levi, W. D.** Rhinoliths.
Kentucky M. J., Bowling Green, 1918—XVI—351.
- Mackenzie, G. W.** Nasal complications of epidemic influenza.
N. York M. J., 1918—CVIII—885.
- Mosher, G. W.** Benign neoplasms of the nasal septum.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—981.
- Patrick, H. T.** Indurative or rheumatic headache.
J. Am. M. Ass., Chicago, 1918—LXXI—82.
- Quinteld, M.** Osteoma of nasal fossæ.
Rev. méd. del Uruguay, Montevideo, 1918—XXI—481.
- Scheppegrell, W.** Susceptibility to hay fever and its relation to heredity, age and seasons.
Pub. Health Rep., Wash., 1918—XXXIII—1191.
- Scheppegrell, W.** Hay fever pollen extracts and their standardization.
Med. Rec., N. Y., 1918—XCIV—141.
- Schoenemann, A.** Powder treatment of the nose in prophylaxis of influenza.
Cor. Bl. schweiz. aertze, Basel, 1918—XLVIII—1125.

- Shook, F. M.** Submucous resection of the nasal septum.
Laryngoscope, St. Louis, 1918—XXVIII—750.
- Souques, A.** Brain tumor with cerebral fluid draining through the sphenoid sinus into nose.
Bull de la Soc. méd. des. hôp., Par., 1918—XI,II—599.
- Stauffer, Fred.** Diseases and deformities of the nose vs. neuralgia of the head.
Laryngoscope, St. Louis, 1918—XXVIII—698.
- Stein, Otto J.** The treatment of intranasal and accessory sinus diseases.
Illinois M. J., Chicago, 1918—XXXIV—202.
- Thoma, K. H.** Dental diseases in relation to diseases of the nose and throat.
Brit. M. J., 1918—CLXXIX—17.
- Turnbull, J. A.** Anaphylaxis in connection with asthma. Hay fever and various skin diseases.
Dental Cosmos, Phila., 1918—LX—1112.
- Winslow, J. R.** Report of some cases, mostly traumatic, of serious damage to the nose and accessory sinuses, operated upon externally with excellent cosmetic results.
Laryngoscope, St. Louis, 1918—XXVIII—679.
- Wishart, D. J. G.** The disease of ozena.
Canad. M. Ass. J., Toronto, 1918—VIII—606.
- Zueblin, E.** Pituitrin and adrenalin injections in hay fever.
N. York M. J., 1918—CVIII—51.

SECTION 9.—ACCESSORY SINUSES.

- Boardman, W. W.** Osteoma of the frontal sinus.
J. Am. M. Ass., Chicago, 1918—LXXI—1553.
- Brownlie, W. B.** Some aspects of maxillary antrum disease.
Brit. M. J., London, 1918—II—403.
- Coakley, Cornelius G.** Observations on pneumococcus infection of nasal accessory sinuses.
Detroit M. J., 1918—XIX—343.

- Culbert, W. L.** Multiple osteoma of the nasal accessory sinuses. Report of a case complicated by syphilis. *N. Y. State J. M.*, 1918—XVIII—465.
- Davis, Warren B.** Anatomy of the nasal accessory sinuses in infancy and childhood. *Ann. Otol., Rhinol. and Laryngol.*, St. Louis, 1918—XXVII—940.
- Harry, P. A.** Calcium lactate in nasal surgery. *Prescriber*, Edin., 1918—XII—117.
- Ibbotson, W.** Headache of sinus origin. *Practitioner*, London, 1918—CI—121.
- Moore, T. W.** The present status of the operative treatment of chronic frontal sinusitis. *J. Am. M. Ass.*, Chicago, 1918—LXXI—1811.
- Naftzger, J. B.** Injury of the face with involvement of the maxillary antrum. *J. Iowa State M. Soc.*, Des Moines, Iowa, 1918—VIII—365.
- Patrick, H. T.** Indurative or rheumatic headache. *J. Am. M. Ass.*, Chicago, 1918—LXXI—82.
- Rice, G. B.** Empyema of both frontal sinuses, with unusual complications. *J. Am. Inst. Homeop.*, N. Y., 1918—XI—77.
- Schelperoort, W.** Scarlatinal ethmoiditis; three cases. *Nederl. tijd. Geneesk.*, Amst., 1918—II—522.
- Souques, A.** Brain tumor with cerebral fluid draining through the sphenoid sinus into nose. *Bull. de la Soc. méd. des. hôp.*, Par., 1918—XLII—599.
- Stein, Otto J.** The treatment of intranasal and accessory sinus diseases. *Illinois M. J.*, Chicago, 1918—XXXIV—202.
- Sterckmans, C.** Chronic sinusitis. *Arch. méd. Belges*, Par., 1918—LXXI—20.

Unger, Max. Studies of roentgenograms of the accessory nasal sinuses, with a description of a new method of taking such pictures.

J. Am. M. Ass., Chicago, 1918—LXXI—1555.

van Iterson, C. J. A. Mucocoele of the ethmoid.

Nederl. tijd. v. Geneesk., Amst., 1918—II—83.

Winslow, J. R. Report of some cases, mostly traumatic, of serious damage to the nose and accessory sinuses, operated upon externally with excellent cosmetic results.

Laryngoscope, St. Louis, 1918—XXVIII—679.

Zemer, S. G. Sinusitis and conservative treatment for selected cases.

Nebraska State M. J., Norfolk, 1918—III—301.

SECTION 10.—PHARYNX, INCLUDING TONSILS AND ADENOIDS.

Aronson, J. D., and Friedberg, S. A. Demonstration of diplococcus meningitis in the adenoid tissue of the nasopharynx.

Med. Rec., N. Y., 1918—XCIV—1017; also,
Mil. Surgeon, 1918—XLIII—552.

Bass, A. L. Clinical study of the faucial tonsil in the adult and its treatment.

Kentucky M. J., Bowling Green, 1918—XVI—363.

Bellin and Vernet. Syphilis of the pharynx.

Par. méd., 1918—VIII—205.

Blum, Sanford. Focal infections in childhood.

Am. J. M. Sc., Phila., 1918—CLVI—681.

Boebinger, M. P. Retropharyngeal abscess.

N. Orl. M. and S., J., 1918—LXXI—249.

Boettcher, Henry R. Ligature of the vessels to arrest hemorrhage after tonsillectomy.

Illinois M. J., Chicago, 1918—XXXIV—212.

- Brose, L. D.** Pneumococcus infection, eye, ear, nose, throat.
South. M. J., Birmingham, 1918—XI—701.
- Bushman, L. B.** Results of tonsillectomy.
Nebraska State M. J., Norfolk, 1918—III—338.
- Campbell, C. A.** Hemangioma of the tonsil.
J. Mich. State M. Soc., Grand Rapids, 1918—XVII—392.
- Cates, T. H.** Simplification of the surgical treatment of peritonsillar abscess.
Laryngoscope, St. Louis, 1918—XXVIII—764.
- Cowan, J.** Vincent's angina.
Brit. M. J., Lond., 1918—I—683.
- Delavan, D. B.** The value of dichloramin-T chlorosane solution (Dakin-Dunham) in the treatment of infections of the upper air passages.
Med. Rec., N. Y., 1918—XCIV—89; also,
Am. J. Surg., N. York, 1918—XXXII—306.
- Dickinson, B. M.** Malignant disease of the throat.
Penn. M. J., Athens, 1918—XXI—611.
- Emrys, Roberts E.** Vincent's angina.
J. Roy. Army Med. Corp., Lond., 1918—XXX—595.
- Faith, Thomas.** Focal infections in relation to diseases of the eye.
Illinois M. J., Chicago, 1918—XXXIV—193.
- Galliard, L.** Gangrene of uvula in purpura.
Bull. et mém. Soc. méd. d. hôp. de Par., 1918—XLII—435.
- Guthrie, D.** Sarcoma of tonsil.
J. Laryngol., etc., 1918—XXXIII—310.
- Harrison, Wm. G.** Probable rôle of teeth and tonsils in the etiology of inflammatory eye diseases.
Am. J. Ophth., 1918—I—660.

- Hammond, Roland.** The teeth and tonsils as causative factors in arthritis.
Am. J. M. Sc., N. Y., 1918—CLVI—541.
- Hess, J. H.** A tonsil depressor.
J. Am. M. Ass., Chicago, 1918—LXXI—1554.
- Janeway, H. H.** Treatment by radium of cancerous mucous membranes.
Am. J. Roentgenol., N. York, 1918—V—414.
- Jones, B. S.** Rapid lateral version of patient in tonsil and adenoid operations.
J. Laryngol., etc., Lond., 1918—XXXIII—308.
- Key, Sam.** An elongated styloid process.
Laryngoscope, St. Louis, 1918—XXVIII—849.
- King, J. M.** Vincent's angina, with report of a case.
Calif. State J. M., San Fran., 1918—XVI—334.
- Leegaard, F.** Retronasal tumors.
Norsk. mag. f. Laegevidensk., Kristiania, 1918—LXXIX—617.
- Marfan.** Acute retropharyngeal abscess in an infant.
Med. Pres, London, 1918—468.
- Mayerberg, E. R.** The relation of tonsils to general disease and the Sluder method of extirpation.
Delaware State M. J., Wilmington, 1918—IX—18.
- McCaskey, C. H.** One hundred and twenty tonsillectomies under gas anesthesia.
Indianapolis M. J., 1918—XXI—325.
- Miller, H. T.** Ludwig's angina.
J. Am. M. Ass., Chicago, 1918—LXXI—1651.
- Nichols, H. J., and Bryan, J. H.** The tonsils as foci of infection in streptococcus hemolyticus carriers.
J. Am. M. Ass., Chicago, 1918—LXXI—1813.
- Oertel, T. E., and Griot, G. A.** Report of a case of primary tuberculosis of faucial tonsils.
J. Am. M. Ass., Chicago, 1918—LXXI—968.

- Rush, C. C.** Retropharyngeal abscess.
J. Am. M. Ass., Chicago, 1918—LXXI—174.
- Schultze, O. T.** Acute vegetative endocarditis with multiple secondary foci of involvement due to micrococcus pharyngitidis siccae.
J. Am. M. Ass., Chicago, 1918—LXXI—1739.
- Sluder, G.** Some clinical observations on the lingual tonsil, concerning goiter, glossodynia and focal infection.
Am. J. M. Sc., Phila., 1918—CLVI—248.
- Taylor, F. E., and McKinstry, W. H.** Serologic investigation of Vincent's angina.
J. Laryngol., London, 1918—XXXIII—289.
- Texier, L., and Tobe.** Complications of Vincent's angina.
Prog. méd., Par., 1918—XXXIII—245.
- Thoma, K. H.** Dental diseases in relation to diseases of the nose and throat.
Brit. M. J., 1918—CLXXIX—17.
- Thomas, G. W.** Large retropharyngeal swelling due to aneurism of the external carotid artery.
Practitioner, London, 1918—CI—169.
- van den Helm, I. J.** Tonsillectomy.
Nederl. tijdschr. v. Geneesk., Amst., 1918—I—1152.
- Welton, C. B.** The tonsil operation and indications which require it: An analysis of 430 cases.
N. York M. J., 1918—CVIII—98.

SECTION 11.—LARYNX.

- Ashby, E. L.** A case of fracture of the hyoid bone.
Lancet, Lond., 1918—I—803.
- Brosé, L. D.** Pneumococcus infection, eye, ear, nose, throat.
South. M. J., Birmingham, 1918—XI—701.
- Brown, J. M.** Granuloma of the larynx.
Calif. State J. M., San Fran., 1918—XVI—332.

- Chamberlin, W. B.** Suspension laryngoscopy—An aid in removing foreign bodies from the larynx and esophagus. Report of cases.
Laryngoscope, St. Louis, 1918—XXVIII—744.
- Fisher, Louis.** Acute laryngitis with edema of the glottis.
Am. Med., N. York, 1918—XIII—596.
- Grazzi, V.** Present status of laryngeal tuberculosis.
Riforma méd., Napoli, 1918—XXXIV—686.
- de Groot.** Chondroma laryngis.
Nederl. Tijdschr. v Geneesk., Amst., 1918—I—1045.
- Guisez.** General anesthesia by intubation.
Presse méd., Paris, 1918—XXVI—441.
- Hoffman, I. M.** The differential diagnosis of the various forms of laryngeal obstruction.
- Jackson, Chevalier.** Acromegaly of the larynx.
J. Am. M. Ass., Chicago, 1918—LXXI—1787.
- Janeway, H. H.** Treatment by radium of cancerous mucous membranes.
Am. J. Roentgenol., N. York, 1918—V—414.
- Levy, J.** Congenital laryngeal stridor: report of two cases with classification of laryngeal affections.
Med. Rec., N. Y., 1918—XCIV—193.
- Lynah, H. L.** The treatment of stenosis of the larynx and trachea following diphtheria.
Laryngoscope, St. Louis, 1918—XXVIII—629.
- McIlraith, C. H.** Pulmonary collapse consequent on papillomata of the larynx.
J. Laryngol., etc., London, 1918—XXXIII—257.
- Munyo, J. C.** Case of cicatricial stenosis of larynx.
Rev. méd. del Uruguay, Montevideo, 1918—XXI—478.
- Owsley, Frederick D.** A new camp disease of the larynx: "Pneumococcus ulcerative laryngitis."
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—874.

- Quix, F. H.** Excision of the larynx for cancer.
Nederl. tijdschr. v. Geneesk., Amst., 1918—I—1047.
- Robertson, C. A.** Laryngeal tuberculosis, its early recognition and curative treatment.
J. Tenn. M. Ass., Nashville, 1918—XI—60.
- Tilley, Herbert.** Some observations on the clinical significance of paralysis of the left vocal cord
J. Laryngol., Lond., 1918—XXXIII—161.
- Tod, H.** Multiple papillomata of larynx removed by operation (suspension method) after tracheotomy. Death few weeks later from acute membranous tracheitis and bronchitis.
Brit. J. Child. Dis., London, 1918—XV—220.
- Uchermann, V.** Chronic stenosis of the larynx or trachea.
Norsk. mag. f. laegevidensk., Kristiania, 1918—LXXIX—872.
- Winslow, P. V.** A few things about laryngeal tuberculosis.
Long Island M. J., Brooklyn, 1918—XII—138.

SECTION 12.—TRACHEA AND BRONCHI.

- Caldwell, Robert.** Foreign bodies in trachea and esophagus.
J. Arkansas M. Soc., Little Rock, 1918—XV—84.
- Freudenthal, W.** Recurrent teratomatous growth of the trachea.
Laryngoscope, St. Louis, 1918—XXVIII—690.
- Hubbard, Thomas.** Report of a case of foreign body in left main bronchus for ten years.
J. Am. M. Ass., Chicago, 1918—LXXI—1380.
- Jackson, Chevalier.** New diagnostic sign of foreign body in the trachea or bronchi, the "asthmatoïd wheeze."
Am. J. M. Sc., Phila., 1918—CLVI—625.
- Lynah, H. L.** The treatment of stenosis of the larynx and trachea following diphtheria.
Laryngoscope, St. Louis, 1918—XXVIII—629.

Tod, H. Multiple papillomata of larynx removed by operation (suspension method) after tracheotomy. Death few weeks later from acute membranous tracheitis and bronchitis.

Brit. J. Child. Dis., London, 1918—XV—220.

Uchermann, V. Chronic stenosis of the larynx or trachea. Norsk. mag. f. laegevidensk., Kristiania, 1918—LXXIX—872.

SECTION 13.—VOICE AND SPEECH.

Bholaraksha, H. S. Treatment of eight cases of concussion aphasia by general anesthesia.

M. J. Siamese Red Cross, Bangkok, 1918—I—29.

Bellstrom, J. Case of word blindness.

Förh Svens. Läk Sällsk Sammank, Stockh., 1917—XLIII—571.

Espejo, L. D. Stuttering.

Crón. méd., Lima, 1918—XXXV—191.

Godfrey, C. G. Some cases of stammering from war shock, treated by psychotherapy.

Med. J. Australia, Sidney, 1918—II—262.

Greene, J. S. The dentist and the clinic for speech defects. J. Nat. Dent. Ass., Huntington, Ind., 1918—V—682.

Kenyon, E. L. The problem of stammering and its solution. Laryngoscope, St. Louis, 1918—XXVIII—629.

Leary, T. Garnet. The significance of stammering and stuttering, with correction measures.

Med. J. Australia, Sidney, 1918—II—259.

Loeza, A. A. Aphasia.

Gac. méd. de Mexico, 1918—XI—286.

Scripture, M. K. Phonetics in relation to speech defects. Laryngoscope, St. Louis, 1918—XXVIII—735.

Scripture, M. K. Therapy of speech defects.

Laryngoscope, St. Louis, 1918—XXVIII—817.

SECTION 14.—ESOPHAGUS.

- Aievoli, E.** Dilatation of esophagus.
Riforma Med., Naples, 1918—XXXIV—594.
- Apfel, H.** Congenital stenosis of the esophagus. Case report.
N. York M. J., 1918—CVIII—108.
- Caldwell, Robert.** Foreign bodies in trachea and esophagus.
J. Arkansas M. Soc., Little Rock, 1918—XV—84.
- Chamberlin, W. B.** Suspension laryngoscopy—An aid in removing foreign bodies from the larynx and esophagus. Report of cases.
Laryngoscope, St. Louis, 1918—XXVIII—744.
- Cottin, E., and Saloz, C.** Cancer of upper esophagus.
Arch. des mal. de l'appar. dig., Par., 1918—IX—697.
- Escudero, P.** Round ulcer in esophagus.
Prensa méd. Argentina, Buenos Aires, 1918—V—7.
- Harbitz, F.** Idiopathic dilatation of esophagus.
Norsk. mag. f. laegevidensk., Kristiania, 1917—LXXIX—841.
- Hubbard, Thomas.** The treatment of lye stricture of the esophagus.
J. Am. M. Ass., Chicago, 1918—LXXI—1706.
- Judd, E. S.** Esophageal diverticula.
Surg., Gynec. and Obst., Chicago, 1918—XXVII—135.
- Kohn, Alfred.** A case of labyrinthal meningitis with suggestions for a new labyrinth operation.
Med. Rec., N. Y., 1918—XCIV—930.
- Mourad, S.** Hysteric spasm of the esophagus.
Ugesk. f. Laeger, Kobenh., 1918—LXXX—1539.

SECTION 15.—ENDOSCOPY.

- Chamberlin, W. B.** Suspension laryngoscopy—An aid in removing foreign bodies from the larynx and esophagus. Report of cases.
Laryngoscope, St. Louis, 1918—XXVIII—744.

Hubbard, Thomas. Report of a case of foreign body in left main bronchus for ten years.

J. Am. M. Ass., Chicago, 1918—LXXI—1380.

Hubbard, T. Description of manikin for practice and demonstration of special instrumentation in bronchoscopy and esophagoscopy.

Laryngoscope, St. Louis, 1918—XXVIII—851.

Tod, H. Multiple papillomata of larynx removed by operation (suspension method) after tracheotomy. Death few weeks later from acute membranous tracheitis and bronchitis.

Brit. J. Child. Dis., London, 1918—XV—220.

SECTION 16.—EXTERNAL EAR AND CANAL.

Deroide, J. Falling of the hair from irritation caused by wax in ear. Two cases.

Presse méd., Par., 1918—XXVI—520.

Harris, Thomas J. Radium in diseases of the ear.

Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—986.

SECTION 17.—MIDDLE EAR, INCLUDING TYMPANIC MEMBRANE AND EUSTACHIAN TUBE.

Brose, L. D. Pneumococcus infection, eye, ear, nose, throat.

South. M. J., Birmingham, 1918—XI—701.

Dench, E. B. Conditions developing in chronic suppurative otitis media which should constitute the basis for exemption from military service.

Laryngoscope, St. Louis, 1918—XXVIII—717.

Harris, Thomas J. Radium in diseases of the ear.

Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—986.

Hill, W., and Patterson, N. Discussion on "the influence of diseases and abnormalities of the nose on the ear."

Proc. Roy. Soc. Med., Lond., 1918—XI—Sect. Otol., 25.

- Jervey, J. W.** Importance of attention to upper respiratory tract in acute otitis media.
J. Am. M. Ass., Chicago, 1918—LXXI—487.
- Loeffler, W.** Herpes zoster of nose and face, with paralysis of ocular muscles.
Corr. Bl. f. schweiz. aertze, Basel, 1918—XLVIII—942.
- Mygind, H.** The prognosis of otogenic sinus phlebitis.
Nord. med. ark., Stockholm, 1917—XVI—1.
- Pollock, H. L.** The treatment of otosclerosis from an etiological standpoint.
Illinois M. J., Chicago, 1918—XXXIV—268.
- Price, C. E.** Middle ear infections.
Illinois M. J., Chicago, 1918—XXXIV—204.
- Rizzi, M. J.** Complications of an otitis.
Semana méd., Buenos Aires, 1918—XXV—33.
- Sandels, C. C.** Acute suppurative otitis media.
Penn. M. J., Athens, 1918—XXI—645.
- Southworth, T. S.** Is the present frequency of acute otitis media and the subsequent mastoid operation in some measure a reproach to pediatrics?
Arch. Ped., N. Y., 1918—XXXV—368.
- Taquino, G. J.** A running ear.
N. Orl. M. and S. J., 1918—LXXI—203.
- Welch, Emmett.** A case report of hemorrhage of the middle ear.
J. Mich. St. M. Soc., Grand Rapids, 1918—XVII—482.
- Wheeler, J. M.** Paralysis of the sixth cranial nerve associated with otitis media.
J. Am. M. Ass., Chicago, 1918—LXXI—1718.

SECTION 18.—MASTOID PROCESS.

- Beck, Joseph C.** Surgical pathology of the mastoid.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—869.

Bigelow, F. Nolton. Types of mastoid structure with special reference to their differentiation by means of stereoradiography.

Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—887.

Bilancioni, G. Mastoiditis from shell concussion.
Policlin. Roma, 1918—XXV—995.

Bowers, W. C. The answer to opponents of the radical mastoid operation.
Laryngoscope, St. Louis, 1918—XXVIII—790.

Caliceti, P. Citelli cell in mastoiditis,
Gazz. d. os. Milan, 1918—XXXIX—544.

Faulkner, E. Ross. Two cases of sinus thrombosis which presented unusual difficulties in diagnosis.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—970.

Fullenwider, C. M. Carcinoma of the mastoid. Case report.
J. Oklahoma M. Ass., Muskogee, 1918—XI—224.

Harris, Thomas J. Radium in diseases of the ear.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—986.

Kerrison, Phillip. A case of abducens paralysis complicating mastoiditis. Brief discussion of this complication as an indication for surgical treatment.
Med. Rec., New York, 1918—XCVI—941.

Kyle, J. J. The modern mastoid operation.
Laryngoscope, St. Louis, 1918—805.

Lathrope, G. H. Acute mastoiditis as a complication of infectious diseases, based on a study of 123 cases in the base hospital at Camp Shelby, Miss.
J. Am. M. Ass., Chicago, 1918—LXXI—451.

Mygind, H. The prognosis of otogenic sinus phlebitis.
Nord. med. ark., Stockholm, 1917—XVI—1.

- Perkins, Chas. E.** Leucocytosis of the spinal fluid in the diagnosis of meningitis.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—974.
- Smith, Clarence H.** Postoperative treatment of mastoiditis.
Am. Med., N. York, 1918—XIII—552.
- Southworth, T. S.** Is the present frequency of acute otitis media and the subsequent mastoid operation in some measure a reproach to pediatrics?
Arch. Ped., N. Y., 1918—XXXV—368.
- Strandberg, O.** Treatment of chronic osteitis of the mastoid process and temporal bone with carbon arc light baths.
Hosp. tid., Kobenh., 1918—LXI—545.

SECTION 19.—INTERNAL EAR.

- Bard, L.** Voltaic nystagmus.
Ann. de méd., Par., 1918—V—239.
- Dickinson, B. M.** Malignant disease of the throat.
Penn. M. J., Athens, 1918—XXI—611.
- Dunn, J.** Some phases of the vestibular nerve problem.
Arch. Ophth., N. Y., 1918—XLVII—354.
- Fisher, Lewis, and Lyman, H. W.** The ear in "stunt" flying.
J. Am. M. Ass., Chicago, 1918—LXXI—1977.
- Fisher, Lewis.** The method of analysis of the Bárány tests in pathologic cases.
Laryngoscope, St. Louis, 1918—XXVIII—724.
- Graef, C.** Some points of interest in tests of labyrinthine function.
Laryngoscope, St. Louis, 1918—XXVIII—811.
- Harris, Thomas J.** Radium in diseases of the ear.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—986.

- Langdon, H. M., and Jones, I. H.** The intimate relation between the ear and the eye as shown by the Bárány tests.
Arch. Ophth., N. Y., 1918—XLVII—348.
- Lemere, H. B.** Oculomotor reaction to labyrinth stimulation.
J. Am. M. Ass., Chicago, 1918—LXXI—901.
- Lewis, E. R.** Influence of altitude on the hearing and the motion sensing apparatus of the ear.
J. Am. M. Ass., Chicago, 1918—LXXI—1398.
- Perkins, C. E.** A case of meningitis treated by labyrinthectomy and decompression.
Laryngoscope, St. Louis, 1918—VIII—695.
- Pieron, H.** Clinical tests of labyrinth.
Presse méd., Par., 1918—XXVI—439.
- Stone, C. L.** Labyrinth tests and their practical application.
Long Island M. J., Brooklyn, 1918—XII—210.
- Yorke, C.** Ablation of labyrinth in a case with Meniere's symptoms.
Brit. M. J., London, 1918—429.

**SECTION 20.—DEAFNESS AND DEAFMUTISM,
AND TESTS FOR HEARING.**

- Bruhn, M. E.** The Müller-Walle method of lip reading.
Proc. Conv. Am. Inst. Deaf, Washington, 1917—XXI—161.
- Callahan, J. F.** Hearing test with voice to detect malingering.
Bost. M. and S. J., 1918—CLXXIX—423.
- Jones, Isaac H.** The value of ear examination to the neurologist.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—881.
- Marichello, H.** Lip reading.
Paris méd., 1918—VIII—145.

- Pieron, H.** Clinical tests of labyrinth.
Presse méd., Par., 1918—XXVI—439.
- Prada.** Influence of acute infections on the hearing.
Prog. de la clin., Madrid, 1918—VI—31.
- Robinson, J. A.** Malingering from the standpoint of the ear.
N. Y. State J. of M., 1918—XVIII—492.
- Stone, C. L.** Labyrinth tests and their practical application.
Long Island M. J., Brooklyn, 1918—XII—210.

**SECTION 21.—FOREIGN BODIES IN THE NOSE,
THROAT AND EAR.**

- Caldwell, Robert.** Foreign bodies in trachea and esophagus.
J. Arkansas M. Soc., Little Rock, 1918—XV—84.
- Chamberlin, W. B.** Suspension laryngoscopy—An aid in
removing foreign bodies from the larynx and
esophagus. Report of cases.
Laryngoscope, St. Louis, 1918—XXVIII—744.
- Hubbard, Thomas.** Report of a case of foreign body in left
main bronchus for ten years.
J. Am. M. Ass., Chicago, 1918—LXXI—1380.
- Jackson, Chevalier.** New diagnostic sign of foreign body in
the trachea or bronchi, the "asthmatoïd wheeze."
Am. J. M. Sc., Phila., 1918—CLVI—625.

**SECTION 22.—ORAL CAVITY, INCLUDING
TONGUE, PALATE AND INFERIOR
MAXILLARY.**

- Adamson, H. G.** Tumor of the parotids involving the skin.
Proc. Roy. Soc. Med., Lond., 1918—XI—73.
- Beck, Joseph C.** Plastic oral surgery.
Dental Review, Chicago, 1918—XXXII—912.
- Black, Arthur D.** Roentgenographic studies of tissues in-
volved in chronic mouth infections.
J. Am. M. Ass., Chicago, 1918—LXXI—1279.

- Blum, Sanford.** Focal infections in childhood.
Am. J. M. Sc., Phila., 1918—CLVI—681.
- Britton, J. M.** The relations of the dental, oral and nasal surgeons.
Dental Summary, Toledo, 1918—XXXVIII—880.
- Bubb, C. H.** Some principles involved in the treatment of mandibular fractures.
Proc. Roy. Soc. Med., Lond., 1918—XI—27.
- Ceballos, A., and Bacigalupo, A. G.** Resection of auriculo-temporal nerve in treatment of parotid fistulas.
Rev. asoc. méd. argent., Buenos Aires, 1918—XXVIII—395.
- Clark, William L.** Cancer of the oral cavity, jaws and throat. Treatment by electrothermic methods or in combination with surgery, the roentgen ray and radium, with an analysis of 200 cases so treated.
J. Am. M. Ass., Chicago, 1918—LXXI—1365.
- Clayton, J. C.** Ether anesthesia for face and jaw surgery.
Lancet, London, 1918—CXC—454.
- Cole, P. P.** The operative treatment of ununited fractures of the mandible.
Proc. Roy. Soc. Med., Lond., 1918—XI—38.
- Cowan, J.** Vincent's angina.
Brit. M. J., Lond., 1918—I—683.
- Dutton, W. F.** Gingival septicopyemia.
Med. Rec., N. Y., 1918—XCIV—893.
- Dowling, J. T.** The relation of the development of the nasal fossa to that of the oral cavity.
Internat. J. Orthodontia, St. Louis, 1918—IV—355.
- Emrys, Roberts E.** Vincent's angina.
J. Roy. Army Med. Corp., Lond., 1918—XXX—595.
- Faith, Thomas.** Focal infections in relation to diseases of the eye.
Illinois M. J., Chicago, 1918—XXXIV—193.

- Feldman, M. H.** A few remarks on the possible systematic autointoxication produced by periapical neglect from the nonsurgical removal of infected teeth.
Dental Summary, Toledo, 1918—XXXVIII—498.
- Federspiel, M. N.** Some observations of the treatment of cleft palate.
Internat. J. Orthodontia, St. Louis, 1918—IV—497.
- De Francesco, D.** Plastic operation on lower lip.
Gazz. d. osp., Milan, 1918—XXXIX—538.
- Forsee, C. G.** Acute secondary parotitis or sialoadenitis following abdominal operations.
Kentucky M. J., Bowling Green, 1918—XVI—358.
- Gibbes, J. H.** Oral sepsis and arthritis.
South. M. J., Birmingham, 1918—XI—489.
- Goetsche, E.** Newer methods in the diagnosis of thyroid disorders, pathologic and clinical.
N. York State J. M., N. Y., 1918—XVIII—259.
- Greene, J. S.** The dentist and the clinic for speech defects.
J. Nat. Dent. Ass., Huntington, Ind., 1918—V—682.
- Guthrie, J. M.** The relation of nasal and oral sepsis to systemic disease and surgical conditions resulting from focal infections.
Dental Cosmos, Phila., 1918—LX—963.
- Harrison, Wm. G.** Probable rôle of teeth and tonsils in the etiology of inflammatory eye diseases.
Am. J. Ophth., 1918—I—660.
- Hammond, Roland.** The teeth and tonsils as causative factors in arthritis.
Am. J. M. Sc., N. Y., 1918—CLVI—541.
- Hansmann, M.** Alveolar pyorrhea.
Cor.-Bl. f. schweiz. aerzte, 1918—XLVIII—1197.
- Head, J.** Vaccine dosage in the elimination of the systemic effects of mouth infection.
Med. Rec., N. Y., 1918—XCIV—17.

- Janeway, H. H.** Treatment by radium of cancerous mucous membranes.
Am. J. Roentgenol., N. York, 1918—V—414.
- King, J. M.** Vincent's angina, with report of a case.
Calif. State J. M., San Fran., 1918—XVI—334.
- Lavastine, L., and Ballet, V.** Tardy epilepsy after mumps.
Bull. de la Soc. méd. des hôp., Par., 1918—XLII—604.
- Lenia, C.** Dental alveolar polyarthritis.
Rev. d. Cursos, Brazil, 1918—IV—124.
- Lyons, C. J.** Fractures and dislocations of the jaws.
Dental Summary, Toledo, 1918—XXXVIII—485.
- Lyons, C. J.** Some vital phases of fractures of the jaws.
J. Am. M. Ass., Chicago, 1918—LXXI—164.
- Manton, W. P.** Parotitis following induced abortion in a case of pernicious vomiting in pregnancy.
J. Am. M. Ass., Chicago, 1918—LXXI—1041.
- Marco, B. Barrymore.** Impacted third molar, causing facial paralysis.
Am. Med., N. Y., 1918—XIII—600.
- Miller, H. T.** Ludwig's angina.
J. Am. M. Ass., Chicago, 1918—LXXI—1651.
- Murray, B. A.** Mouth infection as a source of systemic disease.
Can. M. Ass. J., Toronto, 1918—VIII—988.
- Naftzger, J. B.** Injury of the face with involvement of the maxillary antrum.
J. Iowa State M. Soc., Des Moines, Iowa, 1918—VIII—365.
- New, G. B.** The use of heat and radium in the treatment of cancer of the jaws and cheeks.
J. Am. M. Ass., Chicago, 1918—LXXI—1369.
- Nijkamp, C. H.** Atypical mumps.
Nederl. tijd. v. Geneesk., Amst., 1918—II—323.

- Nisselson, M.** A case of salivary calculus.
N. York M. J., 1918—CVIII—109.
- Pelfort, C.** Tuberculous meningitis after mumps meningitis.
Rev. d. clin. ped., Florence, 1918—XVI—232.
- Pickerill, H. P.** Methods of control of fragments in gunshot wounds of jaw.
Lancet, London, 1918—II—313.
- Power, D. A.** The predisposition to cancer of the tongue.
Lancet, London, 1918—I—781.
- Power, D. A.** Family history in lingual cancer.
Brit. M. J., London, 1918—I—781.
- Qanni, R.** Resection of auriculotemporal nerve for parotid fistula.
Riforma méd., Napoli, 1918—XXXIV—731.
- Rabinowitz, M. A.** Aberrant thyroid tumor of the tongue.
N. York M. J., 1918—CVIII—191.
- Radin, M. J.** The epidemic of mumps at Camp Wheeler, October, 1917-March, 1918.
Arch. Int. Med., Chicago, 1918—XXII—354.
- Railliet, G.** Folds and fissures in tongue.
Bul. de la Soc. méd. d. hôp., Paris, 1918—XLII—802.
- Roberts, John B.** Treatment of gunshot fractures of the mandible.
Ann. Surg., N. Y., 1918—LXVIII—245.
- Robin, J.** To measure force of jaws.
Bull. de l'acad. de méd., Paris, 1918—LXXX—33.
- Saunders, M. B.** Pyorrhea alveolaris.
Med. Rec., N. Y., 1918—XCIV—589.
- Thoma, K. H.** Dental diseases in relation to diseases of the nose and throat.
Brit. M. J., 1918—CLXXIX—17.

- Trimolieres, F., and Caussade, L.** Simulation of mumps.
Bull. d. l. Soc. méd. des hôp., Paris, 1918—XLII—591.
- Vecchi, A.** Traumatic ankylosis of jaw.
Gazz. d. osp., Milano, 1918—XVIII—563.
- Wallstein, Martha.** A further study of experimental parotitis.
J. Exper. M., Baltimore, 1918—XXVIII—377.
- Zentler, Arthur.** Suppurative gingivitis with alveolar involvement: A new surgical procedure.
J. Am. M. Ass., Chicago, 1918—LXXI—1530.
- Zentler, A.** Syphilitic lesions of the mouth.
J. Ass. Mil. Dental Surg., San Fran., 1918—II—125.
- Zerbino, V.** Mumps meningitis.
Arch. Lat.-Am. de Ped., Buenos Aires, 1918—XII—44.
- Zimmerli, K.** Mumps pancreatitis.
Cor. Bl. f. Schweiz. aerzte, Basel, 1918—XLVIII—1245.

SECTION 23.—FACE.

- Arata, A. A., and Woodyatt, R. T.** Treatment of facial erysipelas at Camp Cody, N. M.
J. Am. M. Ass., Chicago, 1918—LXXI—900.
- Clayton, J. C.** Ether anesthesia for face and jaw surgery.
Lancet, London, 1918—CXC—454.
- Cole, P. P.** Scalp flaps and depilation in plastic surgery of the face.
Practitioner, Lond., 1918—C—461.
- D'Emidio, A. S.** Suture of wounds of face.
Gazz. d. osp., Milan, 1918—XXXIX—534.
- De Francesco, D.** Plastic operation on lower lip.
Gazz. d. osp., Milan, 1918—XXXIX—538.
- Lake, Richard.** Three plastic facial operations.
Lancet, London, 1918—II—354.
- Lane, Sir W. A.** Plastic facial surgery.
N. York M. J., 1918—CVIII—14.

Lovett, T. Methods of general anesthesia in facial surgery.
Lancet, London, 1918—I—885.

Loeffler, W. Herpes zoster of nose and face, with paralysis
of ocular muscles.

Corr. Bl. f. schweiz. aertze, Basel, 1918—XLVIII—942.

Maggione, A. Mutilations of the face and necessity for cen-
tralizing measures for reconstruction.

Gazz. d. osp., Milano, 1918—XXXIX—621.

New, G. B. The use of heat and radium in the treatment
of cancer of the jaws and cheeks.

J. Am. M. Ass., Chicago, 1918—LXXI—1369.

Poulard, A. Treatment of cicatrix of the face.

Presse méd., Par., 1918—XXVI—221.

SECTION 24.—CERVICAL GLANDS AND DEEPER NECK STRUCTURES.

Ashby, E. L. A case of fracture of the hyoid bone.

Lancet, Lond., 1918—I—803.

Brose, L. D. Pneumococcus infection, eye, ear, nose,
throat.

South. M. J., Birmingham, 1918—XI—701.

Le Fort. Access to base of neck in front.

Presse méd., Par., 1918—XXVI—373.

Nasseti, F. Blind cysts in the neck.

Clin. chir., Milano, 1917—XXV—298.

Robinson, Beverley. Tuberculous glands of the neck in
young girls.

Am. Med., N. Y., 1918—XIII—599.

Wilson, Louis B. Experimental lesions in the cervical sym-
pathetic ganglia in relation to exophthalmic goiter.

Am. J. M. Sc., Phila., 1918—CLVI—553.

SECTION 25.—THYROID AND THYMUS.

Aikins, W. H. B. Radium therapy in hyperthyroidism,
with observations on the endocrinous system.

Internat. J. Surg., N. Y., 1918—XXXI—217.

- Allen, Carrol W.** Thyroidectomy under local anesthesia.
New Orl. M. & S. J., 1918—LXXI—242.
- Ayalá, A.** Relation between Brazilian trypanosomiasis and endemic goiter.
Gac. méd. de Cáracas, V., 1918—XXV—160.
- Balfour, D. C.** Cancer of the thyroid gland.
Med. Rec., N. Y., 1918—XCIV—846.
- Ballin, Max.** Some unsettled points in the surgery of the thyroid gland.
J. Mich. M. Soc., Grand Rapids, 1918—XVII—463.
- Banuelos, M.** Production of heat with thyroid treatment.
Rev. de méd. y cir. pract., Madrid, 1918—CXX—65.
- Beck, H. G.** The relation of chronic infection to thyroid deficiency.
South. M. J., Birmingham, 1918—XI—492.
- Beck, H. G.** Fat redistribution in the hypophyseal type of dystrophy adiposo genitalis.
Am. J. M. Sc., Phila., 1918—CLVI—711.
- Boot, G. W.** Spontaneous pulsating exophthalmos.
Illinois M. J., Chicago, 1918—XXXIV—217. *
- Bram, Israel.** Nonsurgical treatment of exophthalmic goiter.
N. York M. J., 1918—CVIII—942.
- Brayton, H. W.** Enlarged thymus gland in childhood.
Proc. Conn. M. Soc., New Haven, 1918—CXXVI—117.
- Cordinier, H. C.** The medical treatment of Grave's disease.
N. York State J. M., 1918—XVIII—267.
- Fournier, J. C. M.** Blindness from thyroid deficiency.
Rev. méd. d. Uruguay, Montevideo, 1918—XXI—382.
- Fournier, J. C. M.** Thyroid deficiency.
Siglo méd., Madrid, 1918—LXV—665.
- Gardinier, Hermon C.** The medical treatment of Grave's disease.
Dominion M. Month., Toronto, 1918—LI—49.

- Garraghan, Edward F.** Status thymus lymphaticus.
Illinois M. J., Chicago, 1918—XXXIV—189.
- Giacinto, G.** Tuberculosis of the thyroid.
Policlin., Rome, 1918—XXV—225.
- Gram, H. C.** Exophthalmic goiter in children.
Hosp. tidende, Kobenh., 1918—LXI—913.
- Hart, E. B., and Steenbock, H.** Thyroid hyperplasia and the relation of iodine to the hairless pig malady.
J. Biol. Chem., N. Y., 1918—XXXIII—313.
- Jennings, H. C.** Two cases showing the effect of the incidence of English measles upon preexisting Graves' disease.
Lancet, London, 1918—I—906.
- Kendall, E. C.** The active constituents of the thyroid; chemical groups that are responsible for its physiologic activity.
J. Am. M. Ass., Chicago, 1918—LXXI—871.
- Kimball, O. P., and Marine, D.** The prevention of simple goiter in man.
Arch. Int. Med., Chicago, 1918—XXII—41.
- Knapp, Arnold.** The surgical treatment of corneal supuration in exophthalmic goiter.
Arch. Ophth., N. Y., 1918—XLVII—173.
- Murray, L. A.** Boiling injections in exophthalmic goiter.
Grace Hosp. Bul., Detroit, 1918—III—21.
- Nordentoft, S.** Roentgen treatment of exophthalmic goiter.
Ugesk. f. laeger., Kobenh., 1918—LXXX—1331.
- Odriozola, E.** Exophthalmic goiter in girl of sixteen years.
Cronica méd., Lima, 1918—XXXV—219.
- Palmer, R. J.** The thyroid and a summary of our present knowledge of goiter.
Grace Hosp. Bul., Detroit, 1918—III—12.
- Rabinowitz, M. A.** Aberrant thyroid tumor of the tongue.
N. York M. J., 1918—CVIII—191.

- Rice, J. F.** Medical treatment of exophthalmic goiter.
Med. Press and Cir., London, 1918—CVI—236.
- Rice, J. F.** The medical treatment of exophthalmic goiter.
Med. Rec., N. Y., 1918—XCIV—97.
- Roux, C.** Prophylaxis of goiter.
Rev. méd. de la Suisse Rom., Geneve, 1918—XXXVIII—317.
- Secher, K.** Death following directly on roentgen treatment of exophthalmic goiter.
Ugesk. f. læger., Kobenh., 1918—LXXX—1613.
- Sherrill, J. G.** The thyroid gland, with special reference to goiter.
J. Mich. M. Soc., Grand Rapids, 1918—XVII—309.
- Watson, L. F.** Goiter in pregnancy.
J. Am. M. Ass., Chicago, 1918—LXXI—875.
- Wilson, Louis B.** Experimental lesions in the cervical sympathetic ganglia in relation to exophthalmic goiter.
Am. J. M. Sc., Phila., 1918—CLVI—553.
- Wilson, L. B.** Goiter considered from the standpoint of the pathologist.
Miss. Val. M. J., Louisville, 1916—XXV—225.
- Woodbury, M. S.** The psycho neurotic syndrome of hyperthyroidism.
J. Nerv. and Ment. Dis., N. Y., 1918—XLVII—401.

SECTION 26.—PITUITARY.

- Atwell, W. J.** The development of the hypophysis of the anura.
Anat. Rec., Phila., 1918—XV—73.
- Atwell, Wayne L.** The development of the hypophysis cerebri of the rabbit.
Am. J. Anat., Phila., 1918—XXII—271.
- Barros, F.** Pituitary dystrophy.
Rev. d. curs., Brazil, 1918—IV—87.

Climenko, H. A case of dyspituitarism.

N. York M. J., 1918—CVIII—5.

Pincherle, M. Pituitary insufficiency.

Rev. d. clin. ped., Florence, 1918—XVI—337.

Tucker, B. R. Pituitary disturbance in its relation to the psychoses of adolescence.

J. Am. M. Ass., Chicago, 1918—LXXI—330.

Walker, Clifford B. Distortions of the visual fields in cases of brain tumor; chiasmal lesions, with especial reference to homonymous hemianopsia with hypophyseal tumor.

Arch. Ophth., N. Y., 1918—XLVII—119.

Zueblin, E. Pituitrin and adrenalin injections in hay fever.

N. York M. J., 1918—CVIII—51.

SECTION 27.—ENDOCRANIAL AFFECTIONS AND LUMBAR PUNCTURE.

Albert, F. Lumbar puncture in war surgery.

Lyon chir., 1918—XV—328.

Faulkner, E. Ross. Two cases of sinus thrombosis which presented unusual difficulties in diagnosis.

Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—970.

Kohn, Alfred. A case of labyrinthal meningitis with suggestions for a new labyrinth operation.

Med. Rec., N. Y., 1918—XCIV—930.

Loeza, A. A. Aphasia.

Gac. méd. de Mexico, 1918—XI—286.

Mygind, H. The prognosis of otogenic sinus phlebitis.

Nord. med. ark., Stockholm, 1917—XVI—1.

Pelfort, C. Tuberculous meningitis after mumps meningitis.

Rev. d. clin. ped., Florence, 1918—XVI—232.

- Perkins, C. E.** A case of meningitis treated by labyrinthectomy and decompression.
Laryngoscope, St. Louis, 1918—VIII—695.
- Perkins, Chas. E.** Leucocytosis of the spinal fluid in the diagnosis of meningitis.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—974.
- Sainton.** Facial diplegia after lethargic encephalitis.
Bull. de la Soc. méd. des hôp., Paris, 1918—XLII—808.
- Souques, A.** Brain tumor with cerebral fluid draining through the sphenoid sinus into nose.
Bull. de la Soc. méd. des hôp., Par., 1918—XLII—599.
- Zerbino, V.** Mumps meningitis.
Arch. Lat.-Am. de Ped., Buenos Aires, 1918—XII—44.

SECTION 28.—CRANIAL NERVES.

- Ceballos, A., and Bacigalupo, A. G.** Resection of auriculotemporal nerve in treatment of parotid fistulas.
Rev. asoc. méd. argent., Buenos Aires, 1918—XXVIII—395.
- Fry, Frank R.** Congenital facial paralysis.
Interstate M. J., Chicago, 1918—XXV—856.
- Hutchinson, J.** The operative treatment of trigeminal neuralgia.
Lancet, Lond., 1918—II—12.
- Kerrison, Phillip.** A case of abducens paralysis complicating mastoiditis. Brief discussion of this complication as an indication for surgical treatment.
Med. Rec., New York, 1918—XCVI—941.
- Marco, B. Barrymore.** Impacted third molar, causing facial paralysis.
Am. Med., N. Y., 1918—XIII—600.
- Martin, H. H.** Treatment of injection of the gasserian ganglion.
J. Am. M. Ass., Chicago, 1918—LXXI—1970.

- Qanni, R.** Resection of auriculotemporal nerve for parotid fistula.
Riforma méd., Napoli, 1918—XXXIV—731.
- Sainton.** Facial diplegia after lethargic encephalitis.
Bull. de la Soc. méd. des hôp., Paris, 1918—XLII—808.
- Tilley, Herbert.** Some observations on the clinical significance of paralysis of the left vocal cord.
J. Laryngol., Lond., 1918—XXXIII—161.
- Torres, L.** Syphilitic facial diplegia.
Ann. Paul. de méd. e cir., S. Paulo, 1918—IX—89.
- Wheeler, J. M.** Paralysis of the sixth cranial nerve associated with otitis media.
J. Am. M. Ass., Chicago, 1918—LXXI—1718.

SECTION 29.—PLASTIC SURGERY.

- Alonzo, J. M.** Autoplastics for stenosis of the nose.
Rev. med. del Uruguay, Montevideo, 1918—XXI—514.
- Banister, J. M.** The correction of nasal deformities by the transplantation of bone.
Nebraska M. J., Norfolk, 1918—III—201.
- Beck, Joseph C.** Plastic oral surgery.
Dental Review, Chicago, 1918—XXXII—912.
- Cole, P. P.** Scalp flaps and depilation in plastic surgery of the face.
Practitioner, Lond., 1918—C—461.
- De Francesco, D.** Plastic operation on lower lip.
Gazz. d. osp., Milan, 1918—XXXIX—538.
- Guisez.** Reconstruction after war wound of nose.
Paris méd., 1918—VIII—198.
- Lake, Richard.** Three plastic facial operations.
Lancet, London, 1918—II—354.
- Lane, Sir W. A.** Plastic facial surgery.
N. York M. J., 1918—CVIII—14.

- Wingrave, Wyatt.** Note on the histologic changes occurring at the site of paraffin injection.
J. Laryngol., London, 1918—XXXIII—330.

SECTION 30.—INSTRUMENTS.

- Hess, J. H.** A tonsil depressor.
J. Am. M. Ass., Chicago, 1918—LXXI—1554.
- Hubbard, T.** Description of manikin for practice and demonstration of special instrumentation in bronchoscopy and esophagoscopy.
Laryngoscope, St. Louis, 1918—XXVIII—851.

SECTION 31.—ROENTGENOLOGY.

- Bigelow, F. Nulton.** Types of mastoid structure with special reference to their differentiation by means of stereoradiography.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—887.
- Black, Arthur D.** Roentgenographic studies of tissues involved in chronic mouth infections.
J. Am. M. Ass., Chicago, 1918—LXXI—1279.
- Clark, William L.** Cancer of the oral cavity, jaws and throat. Treatment by electrothermic methods or in combination with surgery, the roentgen ray and radium, with an analysis of 200 cases so treated.
J. Am. M. Ass., Chicago, 1918—LXXI—1365.
- Harris, Thomas J.** Radium in diseases of the ear.
Ann. Otol., Rhinol. and Laryngol., St. Louis, 1918—XXVII—986.
- Nordentoft, S.** Roentgen treatment of exophthalmic goiter.
Ugesk. f. laeger., Kobenh., 1918—LXXX—1331.
- Secher, K.** Death following directly on roentgen treatment of exophthalmic goiter.
Ugesk. f. laeger., Kobenh., 1918—LXXX—1613.

Unger, Max. Studies of roentgenograms of the accessory nasal sinuses, with a description of a new method of taking such pictures.

J. Am. M. Ass., Chicago, 1918—LXXI—1555.

SECTION 32.—SIMULATION.

Callahan, J. F. Hearing test with voice to detect malingering.

Bost. M. and S. J., 1918—CLXXIX—423.

Kerrison, P. D. The tests for malingering in defective hearing.

Laryngoscope, St. Louis, 1918—XXVIII—662.

Lewy, Alfred. Malingering of the ear.

J. Am. Inst. Homeop., Chicago, 1918—XI—417.

Robinson, J. A. Malingering from the standpoint of the ear.

N. Y. State J. of M., 1918—XVIII—492.

SECTION 34.—EYE.

Bell, George Huston. Report of a case of bilateral papilledema due to empyema of sphenoid and ethmoid sinuses. Operation and recovery.

Arch. Ophthal., N. Y., 1918—XLVII—344.

Faith, Thomas. Focal infections in relation to diseases of the eye.

Illinois M. J., Chicago, 1918—XXXIV—193.

Harrison, Wm. G. Probable rôle of teeth and tonsils in the etiology of inflammatory eye diseases.

Am. J. Ophth., 1918—I—660.

Langdon, H. M., and Jones, I. H. The intimate relation between the ear and the eye as shown by the Bárány tests.

Arch. Ophth., N. Y., 1918—XLVII—348.

Lemere, H. B. Oculomotor reaction to labyrinth stimulation.

J. Am. M. Ass., Chicago, 1918—LXXI—901.

INDEX OF AUTHORS.

- ADAMS, C. L., 474, 765.
 Adams, C. G., 770.
 Adson, A. W., 740, 1437.
 Alevoli, E., 1028.
 Allport, F., 330, 631, 765, 1079, 1084, 1087.
 Andrews, 1087, 1092.
 Arcelin, 1054.
 Aronson, J. D., 1413.
 Arrowsmith, H., 1121, 1126, 1145.
 Aymard, J. L., 724, 1012.
 BAB, H., 367.
 Babcock, H. L., 313.
 Ballantyne, C. C., 1427.
 Bane, W. C., 609, 777, 781.
 Barker, L. F., 1415.
 Barnhill, J. F., 630, 1115, 1117, 1239.
 Basila, G., 1013.
 Baum, E., 664.
 Baum, H. L., 773.
 Beck, J. C., 3, 394, 395, 397, 609, 737, 766, 869, 1079, 1080, 1085, 1145, 1454.
 Berens, T. P., 1108, 1508.
 Bergogli, F., 1027.
 Bernard, A., 1905, 1055, 1450, 1464.
 Bernstein, E. J., 645.
 Berterini, J. I., 309.
 Bigelow, F. N., 887.
 Bigo, 1021.
 Bilancioni, G., 1422.
 Binnie, J. F., 1050.
 Birkett, H. S., 1098.
 Blackwell, H. B., 308, 630, 644, 755, 759, 762, 1062.
 Blasi, G., 1029.
 Bobone, T., 1408.
 Boehringer, M. P., 328.
 Boone, J. F., 630.
 Boot, G. W., 313, 629.
 Bowers, W. C., 1484.
 Brockaert, 317.
 Brindel, 703, 718, 744.
 Brown, E. J., 309, 625.
 Braun, A., 461, 753, 761, 1059.
 Brown, G. E., 344.
 Brown, H. B., 386, 390.
 Brown, R. G., 630.
 Bryan, J. H., 1118, 1134.
 Bryant, W. S., 641.
 Brumbaugh, A. S., 1030.
 Burket, W. C., 741.
 Burton, F. A., 631.
 Butler, R., 153.
 Byfield, A., 1407.
 CABOCHE, H., 1298.
 Calhoun, J. C., 644.
 Caliceti, F., 1000.
 Calfas, W. F., 672, 772, 775, 776, 777, 779.
 Callison, J. G., 1059, 1060, 1064.
 Campion, G. G., 1424.
 Canuyt, G., 743, 1040, 1248.
 Carmody, T. E., 691, 788, 1480.
 Carter, W. W., 341, 359, 367, 389, 630, 726, 762.
 Cary, E. H., 609.
 Caussade, L., 1427.
 Cavanaugh, J. A., 206.
 Chabert, 327.
 Chalmette, 723.
 Chamberlin, W. B., 1459, 1476.
 Chambers, T. R., 389, 1453, 1477.
 Chiari, O., 738.
 Chiasserini, A., 1445.
 Clark, J. P., 1139.
 Clark, W. L., 1417.
 Clay, J. V. F., 630.
 Cleminson, F. J., 1426.
 Clevenger, W. F., 630.
 Clothier, J., 645.
 Coakley, C., 1101, 1105, 1123, 1127, 1130, 1135.
 Coates, G. M., 191, 645, 1389.
 Coates, W. W., 1481.
 Coffin, L. A., 1098, 1102, 1105, 1109.
 Cohen, J. S., 862, 1126.
 Cohen, L., 1482.
 Cole, P. P., 1428.
 Coleman, J., 1409.
 Collet, 358.
 Colwell, R. C., 1444.
 Comby, J., 330.
 Cornell, B. S., 1427.
 Cott, G. F., 1148, 1467, 1471.
 Coulet, G., 1430.
 Croissard, 746.
 Crouzon, O., 730.
 Culbert, W. L., 1203.
 Culbertson, L. R., 187.
 Curtin, L. J., 630, 631.
 DABNEY, V., 607.
 Danziger, 758.
 Davis, D. J., 339.
 Davis, G. E., 226, 391, 1035.
 Davis, J. L., 126.
 Davis, W. B., 940.
 de Castro, 1057.
 Dean, L. W., 394, 534, 624, 1037.
 Deglos, 338.
 Delavan, D. B., 139, 1052, 1103, 1125, 1132.
 Dench, E. B., 373, 380, 609, 630, 1071, 1073, 1076, 1078, 1451, 1502, 1506, 1514.
 Dennis, F. L., 571, 782, 789.
 de Parrel, G., 230, 314.
 de Ruyter, L., 999.
 Dieulafe, L., 1372.
 Dighton, A., 630.
 Dixon, 1063.
 Doyle, J. H., 1389.
 Downey, J. W., 614, 617.
 Downing, E. D., 346.
 Drouin, 743.
 Duel, A. B., 653, 1490.
 Dufourmental, L., 365.
 Dunlap, A. M., 631.
 Dunn, J., 1396.
 Durkee, J. W., 629.
 Duverges, J., 727.
 Dworzak, Z., 625.
 Dwyer, J. C., 630.

- EAGLETON, W. P., 609, 1456, 1471, 1493.
 Emerson, F. P., 609, 625, 1250.
 Epler, B., 360.
 FAULKNER, E. R., 970, 1058.
 Fetterolf, G., 1448.
 Fischer, L., 343, 617, 618, 1465.
 Fonseca, C., 1056.
 Ford, M. M., 347.
 Forero, A., 345.
 Forman, J., 137.
 Foster, J. N., 776, 779, 787.
 Fourcade, 999.
 Fowler, R. H., 321.
 Frank, I., 505.
 Frank, M., 505.
 Fraser, J. S., 609, 661, 700.
 Fredrick, M. W., 311, 714.
 Freer, O., 1113, 1126.
 Freudenthal, W., 629, 1148, 1478.
 Friedberg, S. A., 396, 1413.
 Friedlander, A., 1024.
 Friessner, I., 653, 1500.
 Fry, W. K., 1015.
 GAREL, 327.
 Gatewood, 339.
 Guttman, 383.
 Gwin, W. C., 335.
 Gillies, H. D., 1052, 1446.
 Gittins, T. R., 624.
 Glogau, O., 456, 644, 764.
 Gluck, T., 735.
 Goldstein, M. A., 666.
 Got, 318, 1004.
 Gotch, O. H., 1449.
 Graham, H. B., 652.
 Greene, J. E., 100.
 Gregg, J. B., 1037.
 Griffin, E. A., 322.
 Griot, G. A., 1410.
 Guisez, 354.
 Guthrie, D., 1432.
 Guyot, 748.
 HAEGGSTROM, A., 644.
 Hagermann, J. A., 340, 664.
 Haller, D. A., 1444.
 Hallez, G. L., 708.
 Halsted, T. H., 1094, 1104, 1106, 1108, 1118.
 Harmer, W. D., 1434.
 Harris, T. J., 630, 986, 1069, 1071, 1075.
 Haskin, W. H., 1473.
 Hastings, H., 176, 481.
 Hays, H., 625, 630.
 Heller, I. M., 373, 625.
 Hemken, G. H., 334.
 Hempstead, B. E., 344.
 Herzig, 764.
 Hett, G. S., 1010.
 Heessly, 1426.
 Holinger, J., 399, 760, 968, 1084.
 Holmes, C. R., 1093, 1456, 1468, 1471.
 Holmes, E. M., 179.
 Hopkins, F. E., 1258.
 Hopkins, F. T., 1500.
 Horn, H., 288.
 Hovell, M., 314.
 Hubbard, T., 1431.
 Hurd, L. M., 113, 557, 664, 1475, 1486.
 Hurst, A. F., 310.
 IDE, C. E., 609.
 Iglaier, S., 1142, 1151, 1233.
 Imbert, L., 1021.
 Ingersoll, J. M., 630, 1116.
 Isaacs, H. E., 341.
 Ivy, R. H., 1225.
 JACKSON, C., 1039, 1140, 1149, 1451.
 Jacques, P., 316.
 Janeway, H. H., 732.
 Jervay, J. W., 1485.
 Johnson, W. B., 1454.
 Jones, E. B., 629.
 Jones, I. H., 617, 881, 1393, 1486.
 Judd, E. S., 1433.
 KAEMPFER, L. G., 329.
 Kahn, A. H., 388, 1060, 1066.
 Kaufman, O. S., 630.
 Keefer, F. R., 1413.
 Keeler, J. C., 629, 661.
 Kelper, G. F., 629.
 Kenyon, E. L., 767.
 Kerrison, F. D., 392, 618, 630, 652, 755, 759, 1070, 1077, 1078, 1457, 1476.
 King, 372.
 Klestadt, W., 706.
 Kobler, E. W., 998.
 LABERNADIE, 1435.
 Langdon, H. M., 1393.
 Lannois, M., 336.
 Lathrop, G. H.,
 Leal, J., 1057.
 Lebar, 337.
 Lefevre, 1005.
 Lempert, J., 363.
 Levy, R., 773, 780, 785, 787, 788, 789.
 Lewald, L. T., 389.
 Lewis, A. C., 644.
 Lewis, F. O., 1147.
 Lewis, R., 1516.
 Liebault, G., 746.
 Little, G. G., 740.
 Loeb, H. W., 103, 1107, 1438.
 Long, C. H., 396, 644.
 Lubman, M., 664.
 Lukens, R. McD., 352.
 Lutz, 1072, 1075, 1076, 1496.
 Lynah, H. L., 1146.
 Lynch, R. C., 1123, 1137, 1141, 1149, 1150.
 Lyster, T. C., 851.
 MACKENTY, J. E., 784, 1116, 1120, 1472, 1475.
 Mackenzie, G. W., 490, 617, 630.
 Macclay, N., 645.
 Marcondes, C., 1009.
 Marriage, H. J., 661.
 Martini, T., 309.
 Mathers, G. S., 1402.
 Mathers, R. P., 624.
 Maurice, 319, 721.
 Mayer, E., 1094, 1099, 1111, 1117, 1120, 1126, 1143.
 Mayhew, J. M., 732.
 McCaw, J. F., 345.
 McCord, C. P., 1024.

- McCoy, J., 644, 760, 761, 1504, 1514.
 McKenzie, D., 645.
 McKinney, R., 1469.
 McKinstry, W. H., 1014, 1018.
 McNaught, H., 246.
 Miller, S. R., 1415.
 Miller, T. P., 326.
 Milligan, W., 747.
 Montet, 336.
 Moreau, F., 1394.
 Mosher, G. W., 322, 981, 1087.
 Mosher, H. P., 437.
 Moure, E. J., 357, 714, 721, 1272, 1283.
 Muir, R., 609.
 Mullin, W. V., 667, 774, 775, 780, 783.
 Murphy, J. W., 1148.
 Mygind, S. H., 312.
 Myles, R. C., 1134.
 NEW, G. B., 320, 1418.
 Newhart, H., 631.
 Noehren, A. H., 352.
 Nyvaes, J., 1056.
 ODENEAL, T. H., 644.
 Oertel, T. E., 1410.
 Oppikofer, E., 325.
 Orton, H. B., 1261.
 Osborne, O. T., 332, 1017.
 Owsley, F. D., 874.
 PACINI, A. J. P., 744.
 Page, J. R., 589, 751, 1192, 1511, 1517.
 Paget, O., 323.
 Palen, G. J., 609.
 Patel, 1054.
 Pattee, J. J., 677, 782, 784.
 Patton, W. T., 645.
 Perkins, C. E., 974, 1058, 1062, 1064.
 Pern, S., 1056.
 Peters, E. A., 310.
 Pfingst, A. O., 1412.
 Phillips, W. C., 652, 1071, 1075, 1076, 1470, 1488, 1513.
 Pierce, N. H., 625.
 Pietri, P., 721, 1333.
 Pistre, 327, 328.
 Platt, H., 1424.
 Pollock, H. L., 394, 609.
 Pont, A., 707, 729, 1320.
 Poulard, A., 1449.
 Prentiss, H. J., 116.
 Pujol, M., 1414.
 RAE, J. B., 652.
 Ramonet, 739.
 Ransohoff, J., 1425.
 Real, P., 1021.
 Richards, J. D., 587, 1511, 1516.
 Richards, G. L., 373, 378, 1106, 1108.
 Richardson, C. W., 605, 1037, 1112, 1119, 1152, 1455, 1461.
 Ring, C. O., 251.
 Ringle, C. A., 772, 778.
 Robertson, C. M., 770.
 Robertson, H. E., 724.
 Robinson, B., 348, 625.
 Robinson, E. F., 350.
 Rodway, 1424.
 Rossi, A., 1004.
 Rott, O. M., 609, 652.
 Roy, D., 565, 1104.
 Roy, J. N., 326, 725.
 Rozier, J., 722, 1248, 1389.
 Rush, C. C., 1019.
 Ryland, A., 631, 645.
 SALINGER, S., 629.
 Saunders, T. L., 755, 758, 1060.
 Saupiquet, 353.
 Scheppegeirell, W., 1009.
 Schlittler, E., 1386.
 Schreiber, F. C., 630.
 Scruton, W. A., 528.
 Sewall, E. C., 275.
 Shambaugh, G. E., 398, 618, 690, 652, 1087, 1090.
 Sheffield, H. B., 351.
 Shuter, R. E., 661.
 Sluder, G., 1100, 1107, 1108, 1110, 1112, 1130.
 Smith, H., 1125, 1135, 1149.
 Smith, J. M., 374.
 Smith, S. M., 1455.
 Spencer, F. R., 784, 786.
 Stein, O. J., 325, 652, 765, 768, 1483.
 Stone, G. L., 644.
 Strickler, D. A., 773, 778.
 Stucky, J. A., 630.
 Swain, H. L., 1022, 1106, 1108, 1111, 1118, 1119, 1129, 1455.
 Syme, W. S., 645.
 TANAKA, F., 609.
 Taylor, F. E., 1018.
 Theisen, C. F., 594, 600, 1097, 1129.
 Thollon, 1435.
 Tompkins, E., 1039.
 Tremouilleres, F., 1427.
 Tunnichiff, R., 1019.
 VAGLIO, R., 1000.
 Vanderhoof, D. A., 685, 783, 789.
 Verco, J. C., 1011.
 Voorhees, E. G., 732.
 Victors, E. A., 288.
 Voislawsky, A. P., 1456.
 WAGNER, C., 1084.
 Walker, R. C., 1024.
 Wallace, F. E., 771, 780, 782.
 Watson, L. F., 362.
 Watson-Williams, P., 625.
 Weaver, G. H., 364.
 Weil, A. L., 1456, 1477.
 Weinstein, J., 609.
 Weisenberg, T. H., 618.
 Welton, C. B., 630.
 White, L. E., 1474.
 Whiteford, C. H., 1036.
 Whiting, F., 376.
 Whittingham, H. E., 1449.
 Wicart, 709.
 Wilkinson, O., 145.
 Willicutt, G. H., 609.
 Wilson, J. G., 661, 1088, 1093.
 Wiltshire, H., 703.
 Winslow, J. R., 1110, 1103.
 Wolfe, A. C., 189.
 Wollstein, M., 1420.
 Wood, G. B., 731, 1398, 1405.
 Worthington, T. C., 1483.
 Wunderlich, E. B., 396.
 YANKAUER, S., 342.
 Yearsley, M., 652, 661, 666.

INDEX OF TITLES.

- ABSCESS** brain, Wood, 1398.
 Abscess brain with otitis, Chalmette, 723.
 Abscess, epidural, Calhoun, 644.
 Abscess frontal lobe with frontal sinusitis, Mullin, 771.
 Abscess occipital lobe, Martin and Berterini, 309.
 Abscess, peritonsillar, Bilancioni, 1422; Theisen, 600.
 Abscess, retropharyngeal, Rush, 1019.
 Abscess, temporal, otogenous, Glogau, 466.
 Abscess, tongue, Cavanaugh, 206.
 Acromegalia, de Castro, 1067.
 Adenocarcinoma, Hurd, 557.
 Adenoids in infection paranasal sinuses, Dean, 534.
 Adenoids with feminism, Citelli and Caliceli, 1014.
 Adenosarcoma nose, Hurd, 1475.
 Alae nasi, operation for collapsed, Wilkinson, O., 145.
 American Laryngol. Ass'n, 1094.
 American Laryngol., Rhinol. and Otol. Society, 771, 1451.
 Anacusia, value of results, de Parrel, 230.
 Anatomy nasal sinuses in children, Davis, 940.
 Anesthesia, intratracheal, Adson and Little, 740.
 Anesthesia, local, for mastoid operation, Orton, 1261.
 Anesthesia, maxillary sinuses, Canuyt and Rozier, 1348.
 Anesthesia with apothecin and adrenalin, Coleman, 1409.
 Aneurism carotid, hemorrhage after septic sore throat, Ransohoff, 1425.
 Angina Ludwig, Blasi, 1029.
 Angina Vincent, Deglor, 238; Theisen, 594.
 Angioma nose and cheek, Garel and Pistre, 327.
 Antrum, mastoid, approach to, Prentiss, 116.
 Aphonia after thyroidectomy, Guthrie, 1432.
 Aphonia, war, Liebault, Croissard, 746.
 Apothecine-adrenalin anesthesia, Coleman, 1409.
 Army aviation service, Lyster, 851.
 Army otolaryngology, Pierce, 856.
 Asthma, pathogenesis bronchial, Freudenthal, 1478.
 Atresia ear from wounds, Rozier, 1399.
 Atresia external auditory canal, Dean and Gittins, 624.
 Atrophic rhinitis, Coffin, 1105.
 Atrophic rhinitis in different races, Roy, 326.
 Atrophic rhinitis, neosalvarsan, Pistre, 328.
 Atrophic rhinitis, new surgical treatment, Griffin, 322.
 Atrophic rhinitis, vaccine, Horn and Vectors, 288.
 Auricle carcinoma, Saunders and Callison, 1060.
 Aviation examination, Scruton, 392, 528.
 Aviation problems, Bernard, 1005, 1404.
 Aviation service army, Lyster, 851.
 Aviation, testing labyrinth, Hastings, 481.
 Aviators, Barany test, Babcock, 313.
 BARANY test, Jones, 609.
 Barany tests, analysis, Fisher, 1465.
 Barany test for aviators, Babcock, 313.
 Black tongue, Lebar, 337.
 Blastomycosis of larynx, Downing, 346.
 Blastomycosis upper respiratory tract, Dennis, 571.
 Blood pressure, relation to conditions head and neck, Carmody, 691, 788.
 Bone grafting for gunshot injuries jaw, Platt, Camplon, Rodway, 1424.
 Bone transplantation for nasal deformity, Callfas, 672, 776.
 Bovine mastitis, Davis, 339.
 Brain abscess, Maclay, 645; Wood, 1298.
 Brain abscess from frontal sinusitis, Mullin, 667.
 Brain abscess from otitis, Coates, 646.
 Brain abscess, otitic, Glogau, 764.
 Brain, cortical hemorrhage, Eagleton, 1493.
 Brain lesion stimulating labyrinthitis, Friesner, 1500.
 Bronchial tube radiography, Jackson, 1140.
 Bronchus, foreign body, Roy, 565, 1104; Hubbard, 1431.
 CALCULUS, salivary, Carter, 341, 359.
 Carcinoma auricle, Saunders and Callison, 1060.
 Carcinoma epiglottis, Freer, 1126.
 Carcinoma esophagus, Drouin and Canuyt, 743.
 Carcinoma jaw and cheek, radium, New, 1418.
 Carcinoma larynx, Beck, 737.
 Carcinoma lip, Janeway, 732.
 Carcinoma middle ear, Newhart, 631.

- Carcinoma oral cavity, jaws and throat; electrothermia, X-rays, radium, Clark, 1417.
Carcinoma tonsil, radium, Lannois and Montet, 336.
Cardiospasm instrumentation, Whiteford, 1036.
Carotid aneurism, hemorrhage, Ransohoff, 1425.
Carotid bulb wound, Lefevre, 1005.
Carrel-Dakin method after mastoid operation, Page, 751.
Carriers diphtheria, Ballantyne and Cornell, 1427; McCord, Friedlander, Walker, 1924; Keefer, Friedberg, Aronson, 1413.
Carriers meningococcus, Cleminson, 1426.
Cartilage nodules in tonsil, Forman, 137.
Cata, accessory sinuses, Mullin, 775.
Cavernous sinus thrombophlebitis, Got, 1004.
Celluloid in correcting nasal deformities, New, 320.
Cerebellum, diagnosis of disease, Bernstein, 645.
Cerebrospinal fluid, artificial, McKenzie, 645.
Cervical adenitis, nose and throat in, Wood, 731.
Chair, rotation, Phillips, 1493.
Chicago Laryngeal and Otol. Soc., 765, 1079, 1087.
Chin and lip, plastic and dental treatment, Gillies, 1446.
Cicatrices face, treatment, Poulard, 1449.
Cleft palate operation, Gewin, 335.
Clinic for pay patients, Halsted, 1094.
Concussion nystagmus, Moreau, 1394.
Conduction sound, Maurice, 319.
Contusion larynx, Thollon and Labernadie, 1435.
Curette, aural, Hagemann, 664.
Curvature spine compressing larynx, Noehren, 352.
Cyst, dentigerous, Beck, 394.
Cyst, larynx, Dean and Gregg, 1037.
Cyst thyroglossal duct, Freer, 1113.
- DAKIN-DUNHAM solution in throat infections, Delavan, 1052.
Dakin-Dunham solutions in upper air tract, Delavan, 1132.
Dakin solution after mastoid operation, Kerrison, 754.
Deafness, cause and prevention in children, Yearley, 666.
Deafness from internal ear injury in war, Got, 318.
Deafness, hysterical, Hurst and Peters, 310.
Deafness of uncertain origin, Davis, 391.
Deafness, sudden, Stein, 652.
Deafness, tests for malingering, Kerrison, 1457.
Deafness, treatment catarrhal, Robinson, 625.
- Deafness, treatment of catarrhal by vapors, Brown, 309, 625.
Deafness, treatment progressive, Emerson, 1250.
Deafness, value of treatment, de Parrel, 230.
Deafness, war, de Parrel, 314.
Deformities face, Pont, 723.
Deformities, nasal corrected by celluloid, New, 320.
Deformity nose, Marcondes, 1009.
Dentigerous cyst, Beck, 394.
Dichloramin-T in infections throat, Delavan, 1132.
Diphtheria carriers, Keefer, Friedberg and Aronson, 1413; McCord, Friedlander, 1024.
Diphtheria carriers, tonsillectomy, Ballantyne and Cornell, 1427.
Diphtheria larynx, intubation, Sheffield, 351.
Diverticula esophagus, Judd, 1433.
- EAR and eye, relation, Langdon and Jones, 1393.
Ear and focal infection, Palen, 609.
Ear and nose manifestations influenza, Fetterolf, 1448.
Ear, atresia from wounds, Rozier, 1389.
Ear conditions children, Kobler, 998.
Ear conditions, relation to general system, Davis, 226.
Ear, disease and intracranial complications, Boot, 213.
Ear diseases Swiss Army, Schlittler, 1386.
Ear drum, artificial, Baum, 664.
Ear, effect high explosives, Wilson, 1088.
Ear examination in neurology, Jones, 881, 1486.
Ear neuralgia from turbinate hypertrophy, Hopkins, 1500.
Ear, nose, throat disease from pseudodiphtheria bacillus, McNaught, 245.
Ear, nose, throat military surgery, Loeb, 1438.
Ear, nose, throat, relation to general medicine, Emerson, 609.
Ear phenomena, unusual, Cary, 609.
Ear, pouring acid in to evade military service, Phillips, 1498.
Ear prosthesis, Pont, 707.
Ear protectors, Richardson, 1461.
Ear, relation to general diseases, Rott, 609.
Ear syphilis, congenital, Fraser and Muir, 609.
Edema, glottis with laryngitis, Fischer, 343.
Electrothermia for cancer oral cavity, Clark, 1417.
Empyema maxillary sinus, Brown, 386.
Enterococcus brain complications otitis, Caliceti and Vaglio, 1000.
Epiglottitis carcinoma, Freer, 1126.
Epistaxis, menstrual, Bab, 367.
Epistaxis, surgical treatment, Spencer, 786.

- Epithelioma middle ear, Burton, 631.
 Equilibration, cause of defective, Culbertson, 187.
 Esophagoscopy, Forero, 345.
 Esophagus, cancer, Drouin and Canuyt, 743.
 Esophagus diverticula, Judd, 1433.
 Esophagus instrumentation cardiospasm, Whiteford, 1036.
 Esophagus intubation, Gulsez, 354.
 Esophagus, mechanical spoon for, Jackson, 1039.
 Esophagus obstructed by thyroid, Hopkins, 1258.
 Esophagus, stricture, Robinson, 350.
 Ethmoid cell exenteration, Spencer, 784.
 Ethmoid region, fibroma, Fowler, 321.
 Eustachian bougies, method of medicating, Hurd, 113, 664.
 Eustachian tube, obstruction in its general relations, Ide, 609.
 Explosives, effect on ear, Wilson, 661.
 Eye, affected by nasal accessory sinus disease, Ring, 251.
 Eye and ear, relation, Langdon and Jones, 1393.
- FACE and maxillary wounds, Moure, 1233.
 Face cicatrices, treatment, Poulard, 1449.
 Face deformities, Pont, 729.
 Face mask, Bernard, 1450; Haller and Colwell, 1444; Weaver, 364.
 Face reconstruction, Gillies, 1053.
 Facial paralysis, total, Rossi, 1004.
 Feminism with adenoids, Citelli and Calcetti, 1014.
 Fibroma ethmoid region, Fowler, 321.
 Fibroma of nose and nasopharynx, Coates, 191.
 Fistula parotid, treatment, Pietri, 1333.
 Fistula, postaural, Curtin, 631.
 Fistula, salivary, Dienlafa, 1372.
 Focal infection affecting labyrinth, Shambaugh, 652.
 Focal infection and ear, Palen, 609.
 Focal infection labyrinth, Yearsley, 652.
 Foreign bodies larynx, Navarro, 1034.
 Foreign bodies, prevertebral, Patel and Arcelin, 1054.
 Foreign bodies, removal from larynx, Hastings, 176.
 Foreign body bronchus, Hubbard, 1431; Roy, 566, 1104.
 Foreign body trachea, Moure, 357.
 Fossa of Rosenmueller, Yankauer, 342.
 Fractures cranial base involving middle ear, Fraser, 661.
 Fractures lower jaw, Imbert and Real, 1021.
 Fracture nose, Carter, 726.
 Fracture by tympanic plate, Keeler, 661.
 Frontal sinuses, anesthesia, Canuyt and Rozier, 1348.
 Frontal sinus osteoma, Barnhill, 1115; Sewall, 775.
 Frontal sinus operation, Boehring-er, 328.
 Frontal sinusitis and abscess frontal lobe, Mullin, 771.
 Frontal sinusitis, Lothrop operation, Pattee, 782.
- GAS bacillus infection in chronic mastoiditis, Carter, 630.
 Gastrotomy to dilate stricture esophagus, Robinson, 350.
 Gauze mask, Bernard, 1055, 1450.
 Goiter, Epler, 360; Watson, 362.
 Goiter after roentgen treatment, Verning, 366.
 Goiter, toxic element, Fern, 1056.
 Gonococcus infection mouth, Mayhew, 733.
 Gradenigo's syndrome, Dighton, 630.
 Granuloma mastoid, Richards, 587.
 Grippe, aural complications, Dench, 609.
 Gumma causing deafness, Heller, 625.
 Gunshot wounds ear, Klestadt, 706.
- HARELIP operation, Gewin, 334.
 Hay fever, pollen extracts, Scheppegrell, 1009.
 Hay fever, surgical treatment, Miller, 326.
 Head and neck conditions related to blood pressure, Carmody, 691.
 Head and neck plastic operations, Beck, 1080; Carmody, 1480.
 Heath operation, Kaufman, 630.
 Heliotherapy larynx, Collet, 358; Sauquet, 353.
 Hemorrhage from carotid aneurism after septic sore throat, Ransohoff, 1425.
 Hemorrhage, nasopharyngeal, Crouzon, 730.
 High explosives, effect on ear, Wilson, 1088.
 History nose and throat, Vanderhoof, 685.
 Hypophysis lesions, experimental, Chiasserini, 1445.
 Hypophysis surgery, Novaes, 1056.
 Hypophysis tumor, de Castro, 1057; Leal, 1057.
 Hypophysis tumors, intradural approach, 1437.
- INDEX of literature, 402, 719, 1155, 1520.
 Infection after intranasal operations, Wood, 1405.
 Infection in nose and throat, remote results, Greene, 160.
 Infection in tonsils incompletely removed, Loeb, 103.
 Influenza, ear and nose manifestations, Fetterolf, 1448.

- Influenza epidemic 1918, Gotch and Whittingham, 1449.
 Influenza in Switzerland, Holinger, 968.
 Influenza with sinus disease, Robertson, 724.
 Insufflation, nasal, of tuberculin, Paget, 223.
 Intermaxillary bone, syphilitic necrosis, Richardson, 605, 1112.
 Internal ear, Jones, 617.
 Internal ear disease, Mygind, 312.
 Internal ear histopathology in typhoid, etc., Tanaka, 609.
 Internae secretion, relation of glands to otolaryngology, Beck, 609.
 Internal secretion, relation of glands to ear, nose, throat, Pollock, 609.
 Intubation esophagus, Guisez, 354.
 Intubation in diphtheria larynx, Sheffield, 351.
 Intubation in membranous laryngitis, Wolfe, 189.
 Intubation, prolonged, Mayer, 1117.
 Intracranial abscess, otogenous, Glogau, 456.
 JAW, bone grafting for gunshot injuries, Platt, Campion, Rodway, 1424.
 Jugular bulb suppuration, McCoy, 644.
 KERATOCHROMOGLOSSITIS, Lebar, 337.
 LABYRINTH affections, Phillips, 652; Rae, 652.
 Labyrinth examination, Moure, 714.
 Labyrinth fistula, Auerbach, 653.
 Labyrinth, focal infection, Yearstey, 652.
 Labyrinth in syphilis, Downey, 617.
 Labyrinth, indications for operation, Rott, 652.
 Labyrinth, normal reactions, Hastings, 481.
 Labyrinth, primary disease from focal infection, Shambaugh, 652.
 Labyrinth, static, Jones and Fisher, 617.
 Labyrinth suppuration, Ducl, 653.
 Labyrinth syphilis, Spinola, 398.
 Labyrinth, vertigo from primary disease, Shambaugh, 618.
 Labyrinthectomy, McCoy, 760.
 Labyrinthitis and cerebellar lesions, Friesner, 652.
 Labyrinthitis, serous, Graham, 652.
 Labyrinthitis simulated by brain lesion, Friesner, 1500.
 Labyrinthitis with meningitis, Saunders, 755.
 Labyrinthomeningitis after radical mastoid, 1060.
 Laryngitis, early intubation in membranous, Wolfe, 189.
 Laryngitis tuberculous, Lukens, 352.
 Laryngitis with edema glottis, Fischer, 343.
 Laryngology, early in Philadelphia, Cohen, 362.
 Laryngoscopy, direct in stenosis, Lynah, 739.
 Laryngotomy in children, McCaw, 345.
 Larynx, blastomycosis, Downing, 346.
 Larynx compressed by spinal curvature, Noehren, A. H., 352.
 Larynx, contusion, Liebault, 1034; Thollon and Labernadie, 1435.
 Larynx cyst, Dean and Gregg, 1037.
 Larynx, leeches in, Navarro, 1034.
 Larynx lymphangioma, Richardson, 1037.
 Larynx malignancy, Arrowsmith, 1121.
 Larynx, malignant disease, Beck, 737.
 Larynx, new camp disease, Owsley, 374.
 Larynx, perichondritis, Canuyt, 1040.
 Larynx, primary blastomycosis, Dennis, 571.
 Larynx, removal foreign bodies, Hastings, 176.
 Larynx, stenosis with measles, Ford, 347.
 Larynx stenosis, Iglaue, 1142, 1233; Jacques, 356.
 Larynx, war injuries, Harmer, 1434.
 Larynx, war wounds, Ramonet, 739.
 Larynx, wound phlegmon, recurrent paralysis, Coulet, 1430.
 Larynx wounds, Ferreri, 736.
 Lateral sinus disease, Ryland, 645.
 Lateral sinus, locating from external markings, Prentiss, 116.
 Lateral sinus phlebitis, Stone, 644.
 Lateral sinus, rupture after mastoid operation, Coates and Doyle, 1389.
 Lateral sinus thrombosis, Caldera, 717; Faulkner, 970, 1058; Lewis, 644; Maclay, 645; Lewis, 1516; McKinney, 1469.
 Lateral sinus unusual wounding, Dabney, 607.
 Leeches in larynx, Navarro, 1034.
 Leptomenigitis of otitic origin, 149; Layman, D., 149.
 Leucocytosis spinal fluid in meningitis, Perkins, 974, 1062.
 Ligation common carotid, Lefevre, 1005.
 Lip and chin, plastic surgery, Gillies, 1446.
 Lothrop operation frontal sinusitis, Pattee, 677.
 Lower jaw fractures, Imbert, L., 1021.
 Ludwig's angina, Biasi, 1029.
 Lungs, radiographic localization of lobes, Jackson, 1451.
 Lymphangioma larynx, Richardson, 1037.

- MALINGERING**, hearing tests, Kerrison, 1467.
- Mask** in prophylaxis, Bernard, 1055, 1450.
- Mastoid abscess**, fatal, Lutz, 1486.
- Mastoid antrum**, approach to, as modified by surface markings, Prentiss, 118.
- Mastoid cellulitis**, Rozier, 720.
- Mastoidectomy** followed by rupture lateral sinus, Coates and Doyle, 1389.
- Mastoidectomy** followed by salivary fistula, Schreiber, 630.
- Mastoid**, end results 100 radical operations, Stucky, 630.
- Mastoid**, extradural abscess, Blackwell, 644.
- Mastoid granuloma**, Richards, 587.
- Mastoid**, Heath operation, Kaufman, 630.
- Mastoid operation**, Dakin solution, Kerrison, 754.
- Mastoid operation**, Blackwell, 308; Kerrison, 630.
- Mastoid operation**, eustachian irrigation in Jervey, 1485.
- Mastoid operation**, fistula test after, Phillips, 1483.
- Mastoid operation** followed by Carrel-Dakin method, Page, 751.
- Mastoid operation** followed by meningitis, Page, 1517.
- Mastoid operation**, indications, Dench, 630.
- Mastoid operation**, local anesthesia, Orton, 1261.
- Mastoid operation**, modified radical, Blackwell, 630.
- Mastoid**, radical operation, Harris, 630; McCoy, 760; Smith, 374; Welton, 630; Bowers, 1484.
- Mastoid**, skiagraphy, Bigelow, 887, 1460; Clevenger, 630.
- Mastoid**, subperiosteal abscess, Salinger, 629.
- Mastoid**, surgical pathology, Beck, 869.
- Mastoidectomy**, facial paralysis, Page, 589.
- Mastoiditis**, Huntington, 717.
- Mastoiditis** complicating infectious diseases, Lathrop, 1388.
- Mastoiditis**, hemorrhagic, Boot, 629.
- Mastoiditis**, lumbar puncture, Ryland, 631.
- Mastoiditis**, scarlatinal, Haegstrom, 644.
- Mastoiditis**, staphylococic, 1076.
- Mastoiditis**, tuberculous, Hays, 630.
- Mastoiditis**, two cases latent, Chamberlin, 1476.
- Mastoiditis**, unusual cases, Keeler, 629.
- Mastoiditis** with cerebral complication, Patton, 645.
- Mastoiditis** with diabetes, etc., Freudenthal, 629.
- Mastoiditis** with extraordinary leucocytosis, Kelper, 629.
- Mastoiditis** with gas bacillus infection, Carter, 630.
- Mastoiditis** with pus in neck, Durkee, 629.
- Maxillae**, wounds, Moure, 1285.
- Maxilla**, gunshot wounds, Fry, 1015.
- Maxillary sinus**, anesthesia, Canuyt and Rozier, 1348.
- Measles** with stenosis larynx, Morris, 347.
- Measles**, throat smears, Tunnicliff, 1019.
- Membranous laryngitis**, early intubation, Wolfe, 189.
- Meniere's syndrome**, and gastrointestinal sepsis, Hovell, 314.
- Meningitis**, abducens paralysis, Kerrison, 759.
- Meningitis** after fracture petrous, de Ruyter, 999.
- Meningitis** after mastoidectomy, Page, 589, 1517.
- Meningitis** after middle turbinate operation, Harris, 1241.
- Meningitis** and labyrinthitis, Saunders, 755.
- Meningitis**, diagnosis, Perkins, 970.
- Meningitis** from otitis, Clothier, 645.
- Meningitis**, leucocytosis of spinal fluid in, Perkins, 1062.
- Meningitis**, otitic, Elras, 998; Jacques, 316.
- Meningitis**, serous, McCoy, 1504.
- Meningococcus** carriers, Cleminson, 1426.
- Meningococcus**, identification, Olitsky, 363.
- Military surgery** ear, nose, throat, Loeb, 1423.
- Mouth** and nose, wounds mucosa, Cole, 1428.
- Mouth** gag, Allport, 330; Moyer, 339.
- Mouth**, gonococcus infection, Mayhew, 733.
- Mouth** infections, Osborne, 332, 1017.
- Mouth** infection, diagnosed Vincent's angina, Brumbaugh, 1030.
- Mumps** and myocarditis, Pujol, 1414.
- Mumps** simulation, Tremolieres and Caussade, 1427.
- Mycosis fungoides**, Verco, J. C., 1011.
- Myocarditis** and mumps, Pujol, 1414.
- NASAL** septum, benign neoplasms, Mosher, 951.
- Nasal** septum deformity in children, Kaempfer, 329.
- Nasal** septum neoplasm, Mosher, 1037.
- Nasal** sinuses, anatomy in children, Davis, 940.
- Nasal** splint, Stein, 325.
- Nasopharynx**, fibroma, Coates, 191.
- Nasopharynx**, stenosis, Isaacs, 341.
- Neck** and head, plastic surgery, Carmody, 1480.
- Neck**, phlegmon, Worthington, 1483.

- Necrosis intermaxillary bone, Richardson, 605.
- Neoplasms nasal septum, Mosher, 981, 1087.
- Neosalvarsan in ozena, Pistre, 328.
- Nerve implantation for recurrent paralysis, Hoessly, 1436.
- Neuralgia ear from turbinate hypertrophy, Hopkins, 1500.
- Neurologist, value ear examination to, Jones, 881, 1486.
- Neuritis eighth nerve, Mackenzie, 450.
- New York Academy Medicine, 751, 760, 1058.
- New York Otological Society, 1069, 1438, 1500.
- Noise apparatus, electrical, Liebman, 664.
- Nose, accessory sinuses in children, Davis, 940.
- Nose, accessory sinus disease affecting eye, Ring, 251.
- Nose, adenocarcinoma, Hurd, 557.
- Nose, adenocarcinoma, Hurd, 1475.
- Nose and ear manifestations influenza, Fetterolf, 1448.
- Nose and mouth, wounds mucosa, Cole, 1428.
- Nose and sinuses trauma, Winslow, 1100.
- Nose and throat in cervical adenitis, Wood, 731.
- Nose and throat in medical history, Vanderhoof, 685, 789.
- Nose and throat, remote results of infection, Greene, 160.
- Nose angioma, Garel and Pistre, 327.
- Nose, chronic infection sinuses in childhood, Byfield, 1407.
- Nose deformities, bone transplantation, Callias, 776.
- Nose deformities corrected by celluloid, New, 320.
- Nose deformities, correction, Callias, 672.
- Nose, deformity and obstruction, Marcondes, 1009.
- Nose, fibroma, Coates, 191.
- Nose fracture, Carter, 726.
- Nose, freeing mucosa by paraffin, Chabert, 327.
- Nose, infection after intranasal operation, Wood, 1405.
- Nose, operation for bony atresia, White, 1474.
- Nose, plastic repair ala, Ivy, 1225.
- Nose, pneumococcus infection sinuses, Coakley, 1127.
- Nose, prosthesis, Pont, 1320.
- Nose reconstruction, Aymard, 724, 1012.
- Nose, repair of defects, Hett, 1010.
- Nose, syphilis, Basile, 1013.
- Nose, throat, ear military surgery, Loeb, 1438.
- Nose, throat, ear, pseudodiphtheria bacillus in, McNaught, 245.
- Nose, war injury, Bobone, 1408.
- Nose, war wounds, Caboche, 1298.
- Nystagmus, apparatus for evoking, Rozier, 722.
- Nystagmus from concussion, Moreau, 1394.
- ORIENTATION, cause of defective, Culbertson, 187.
- Osteoma frontal sinus, Barnhill, 1115, 1239; Sewall, 275.
- Osteoma nasal accessory sinuses, Culbert, 1203.
- Otitic meningitis, Elras, 998.
- Otitis, chronic adhesive, Watson-Williams, 625.
- Otitis media, bacteriology, Dwyer, 630.
- Otitis media, chronic hyperplastic, Emerson, 1250.
- Otitis media, chronic secretory, Emerson, 625.
- Otitis media, chronic suppurative, McCoy, 760; Dench, 1451.
- Otitis media complications, Brindel, 703, 718.
- Otitis media, early operative treatment, Brown, 630.
- Otitis media, end results treatment suppurative, Barnhill, 630.
- Otitis media etiology chronic suppurative, Clay, 630.
- Otitis media, nonoperative treatment, Pierce, 629.
- Otitis media diphtheritic origin, Bane, 609.
- Otitis media, pathology chronic suppurative, Mackenzie, 630.
- Otitis media, prevention chronic suppurative, Mackenzie, 630.
- Otitis media with brain abscess, Coates, 645.
- Otitis media with cerebral abscess, Chalmette, 723.
- Otitis media with cerebral and cerebellar complications, Syme, 645.
- Otitis media with cortical brain hemorrhage, Eagleton, 1493.
- Otitis media with endocranial complications, Caliceti and Vaglio, 1000.
- Otitis media with facial paralysis, Jones, 629.
- Otitis media with meningitis, Clothier, 645.
- Otitis media with paralysis external rectus, Shambaugh, 630.
- Otitis media with pneumococcemia, Dench, 1514.
- Otitis media with pneumonia, Weinstein, 609.
- Otitis media with vertigo, Kerrison, 618.
- Otitis media with Vincent's disease, Mathers, 624.
- Otolaryngology in army, Pierce, 865.
- Otolaryngology, relation to glands of internal secretion, Beck, 605.
- Otolaryngology, report for first year of war, Mosher, 437.
- Otolaryngology, subcommittee report, Richardson, 1152.

- Otology digest of literature for 1917, Rott, 609.
 Otorhinolaryngology, progress, Du-fourmental, 365.
 Otorrhea, atypical, Lampert, 368.
 Otosclerosis, Frederick, 311, 714.
 Ozena, Coffin, 1105.
 Ozena among various races, Roy, 326, 735.
 Ozena, neosalvarsan, Pistre, 328.
 Ozena treatment, Duverges, 727.
 Ozena, vaccine treatment, Horn and Nictors, 288.
 PARAFFIN, freeing nasal mucosa, Chabert, 327.
 Palate, perforating ulcer resembling tertiary syphilis, Barker and Miller, 1415.
 Paralysis, abducens, Kerrison, 759.
 Paralysis, cords, bilateral and abductor, Butler, 153.
 Paralysis, double facial, Halles, 708.
 Paralysis, external oculomotor, Brockaert, 317.
 Paralysis external rectus with otitis media, Shambaugh, 630.
 Paralysis, facial, Rossi, 1004.
 Paralysis facial after mastoidectomy, Page, 589.
 Paralysis facial with otitis media, Jones, 629.
 Paralysis, nerve implantation for recurrent, Hoessly, 1436.
 Paralysis recurrent laryngeal, Brown and Hempstead, 344; Coulet, 1430.
 Paralysis vocal cord, Davis, 1035.
 Paranasal sinus infection in children, Dean, 534.
 Paranasopharyngitis from tonsils, Botticelle, 1028.
 Parotid fistula, treatment, Pietri, 1333.
 Parotitis, Wollstein, 1420.
 Parotitis causing deafness, Willcutt, 609.
 Perforations tympanic, closure, Allport, 631.
 Perforations, tympanic, repair, Dunlap, 631.
 Perichondritis larynx, Canuyt, 1040.
 Perisinus abscess, Blackwell, 644; Glogau, 644; Long, 644.
 Peritonsillar abscesses, Bane, 777; Theisen, 600.
 Pertussis, Fonseca, C., 1056.
 Phlegmon of neck, Worthington, 1453.
 Phototherapy larynx, Saupiquet, 353.
 Plastic operations head and neck, Beck, 1080; Carmody, 1480.
 Plastic of lip and chin, Gillies, 1446.
 Plastic repair ala nasi, Ivy, 1225.
 Pneumococcemia with ear involvement, Dench, 1514.
 Pneumococcal laryngitis, Owsley, 874.
 Pneumococcus infection, nasal accessory sinuses, Coakley, 1127.
 Pneumonia and otitis media, Weinstein, 609.
 Pollen extracts in hay fever, Scheppegrell, 1009.
 Prosthesis ear Pont 707.
 Prosthesis nose Pont, 1320.
 Pseudodiphtheria bacillus, role of, McNaught, 245.
 Radiography bronchial tube after insufflation with bismuth, Jackson, 1140.
 Radiography in otology, etc., Boone, 630.
 Radiography lungs, Jackson, 1451.
 Radiography mastoid, 1069; Bigelow, 887; Clevenger, 630.
 Radiography stereoscopic of head, Ingersoll, 630.
 Radiography, stereoscopic of mastoid, Bigelow, 1460.
 Radium, Simpson needles, Freer, 1126.
 Radium for cancer, jaw and cheek, New, 1418.
 Radium for cancer oral cavity, Clark, 1417.
 Radium in cancer lip, Janeway, 732.
 Radium in ear diseases, Harris, 986.
 Radium in sclerosis of middle ear, Dworzak, 625.
 Radium in tonsil cancer, Lannols and Montet, 336.
 Recurrent laryngeal paralysis, Brown and Hempstead, 344.
 Recurrent paralysis, nerve implantation, Hoessly, 1436.
 Rhinoplasty, Moure, 1272; Pont, 1320.
 Rhinoplasty of Tagliacozzi, Frank and Frank, 505.
 Rhinoscopy, Holmes, 179.
 Rinne test, analysis, Downey, 614.
 Roentgen treatment goiter, Verling, 366.
 Rosenmueller fossa, Yankauer, 342.
 Rotation chair, improved, Phillips, 1493.
 SALIVARY calculus, Carter, 341, 353.
 Salivary fistula, Dienlafa, 1372.
 Sarcoma soft palate, Voorhees, 732.
 Sarcoma tonsil, Semken, 334.
 Sclerosis middle ear, radium, Dworzak, 625.
 Seltzer water for throat, Comby, 330.
 Septic sore throat, Davis, 339.
 Septum deformity, nasal, Kaempfer, 328.
 Septum, reoperation submucous resection, Mosher, 322.
 Shell shock, Wiltshire, 703.
 Sinus disease, influenzal, Robertson, 724.
 Sinus, osteoma frontal, Barnhill, 1239; Sewall, 275.
 Sinuses, accessory of cats, Mullin, 775.
 Sinuses, accessory of nose, relation to eye disease, Ring, 251.

- Sinuses, infection in children, Dean, 534.
 Sinuses, local anesthesia, Canuyt and Rozier, 1348.
 Sinuses, osteoma nasal accessory, Culbert, 1203.
 Sinuses, tuning fork test, Oppikofer, 325.
 Sinusitis, chronic with toxic manifestations, MacKenty, 1472.
 Sinusitis, frontal, Lothrop operation, Pattee, 677.
 Sinusitis, frontal with brain abscess, Mullin, 667.
 Sinus infection in childhood, Byfield, 1407.
 Sinus, lateral, external markings, Prentiss, 116.
 Sinus, operation frontal, Boehringer, 328.
 Sinus, rupture lateral after mastoid operation, Coates and Doyle, 1389.
 Sinus thrombosis, Braun, 762; Brown, 386; Faulkner, 970, 1058; Glogau, 644.
 Sinus thrombosis, cavernous, Got, 1004.
 Sinus thrombosis, lateral, Lewis, 644.
 Sinus thrombosis, pathology, Braun, 461.
 Sinus thrombosis, sigmoidal, Odeane, 644.
 Sinus, unusual wounding lateral, Dabney, 607.
 Society Proceedings, Amer. Laryngol. Ass'n, 1094.
 Society Proceedings, Amer. Laryngol., Rhinol. and Otol. Society, 1451.
 Sound conduction, Maurice, 319.
 Society Proceedings, Chicago Laryngol. and Otol. Society, 765, 1079, 1087.
 Society Proceedings, Joint Meeting Amer. Laryngol. Ass'n and L., R. and O. Society, 1140.
 Society proceedings, Midwestern Section A. L., R. and O. Soc., 771.
 Society proceedings, New York Academy of Medicine, 751, 760, 1058.
 Society proceedings, N. Y. Otological Society, 1069.
 Society progressive oral advocates, Goldstein, 666.
 Soft palate, sarcoma, Voorhees, 732.
 Sound conduction, Maurice, 319.
 Sound perception, measuring, Maurice, 721.
 Spanish gripe in Switzerland, Holinger, 968.
 Speech correction, Swift, 348.
 Sphenoiditis hypertrophic, Sluder, 1130.
 Sphenopalatine ganglion cases, Sluder, 1110.
 Splint, nasal, Stein, 325.
 Spoon for esophagus, Jackson, 1039.
 Stammering, Pacini, 744; Tompkins, 1039.
 Staphylococcus mastoiditis, 1076.
 Staphylococcus pyogenes infection upper respiratory tract, Gardner, 360.
 Status lymphaticus, Carter, 367.
 Stenosis, laryngotracheal, Lynah, 739.
 Stenosis larynx, Iglaue, 1233; Jacques, 356; Morris, 347.
 Stenosis nasopharynx, Isaacs, 341.
 Stricture esophagus, Robinson, 350.
 Sublingual medication, Robinson, 348.
 Suspension laryngoscopy, Lynch, 1141.
 Swiss army, ear diseases, Schlittler, 1386.
 Switzerland, gripe in, Holinger, 968.
 Syphilis ear, congenital, Fraser and Muir, 609.
 Syphilis labyrinth, Spinola, 993.
 Syphilis nose, Basile, 1013.
 Syphilis, static labyrinth, Downey, 617.
 Syphilis superior maxilla, Richardson, 1112.
 TAGLIACOZZI'S rhinoplasty, Frank and Frank, 605.
 Test, after-turning nystagmus, Mackenzie, 617.
 Test, galvanic, Mackenzie, 617.
 Thermal waters for tubotympanic insufflation, Fourcade, 999.
 Throat and nose infection, remote results, Greene, 160.
 Throat and nose in medical history, Vanderhoof, 635.
 Throat diseases, systemic manifestations, Pfingst, 1412.
 Throat in typhoid, Bergoli, 1027.
 Throat, nose, ear, military surgery, Loeb, 1438.
 Throat, pseudodiphtheria bacillus in, McNaught, 245.
 Throat smears in measles, etc., Tunncliffe, 1020.
 Thyroglossal duct cyst, Freer, 1113.
 Thyroid causing obstruction esophagus, Hopkins, 1258.
 Thyroidectomy, aphonia after, Guthrie, 1432.
 Thyroidism after roentgen treatment, Verner, 366.
 Thyroid hyperplasia, Epler, 360.
 Thyroid neoplasm, Binnie, 1050.
 Thyrotomy, Brindel, 744.
 Tongue, abscess, Cavanaugh, 206.
 Tongue depressor, Moyer, 339.
 Tongue, sublingual medication, Robinson, 348.
 Tongue, surgery, Beck, 2.
 Tonsils, accessory, Hagemann, 340.
 Tonsil and paraneuritis, Botteselle, 1026.
 Tonsil cancer, radium, Lannois and Montet, 336.
 Tonsil, cartilage nodules in, Forman, J., 137.

- Tonsil, facts and fancies, Swain, 1022.
 Tonsil sarcoma, Hemken, 334.
 Tonsil, susceptibility to infection of incompletely removed, Loeb, 103.
 Tonsil tuberculosis, 331; Oertel and Griot, 1410.
 Tonsillectomy, Bigo, 1021.
 Tonsillectomy hemorrhage, Alevoli, 1028.
 Tonsillectomy technic, Adams, 474, 765.
 Tonsillitis and paranasal sinus infection, Dean, 534.
 Tonsils effects of diseased, Davis, 1265.
 Tracheobronchoscopy, Forero, 345.
 Trachea, foreign body, Moure, 357.
 Trachea, resection and suture, Chiari, 738.
 Trachea, transplantation, Burket, 741.
 Trachea, war wounds, Ramonet, 735.
 Tuberculosis larynx, Lukens, 352.
 Tuberculosis, nasal insufflation tuberculin, Paget, 323.
 Tuberculosis tonsils, 331.
 Tubotympanic insufflation with thermal waters, Fourcade, 399.
 Tumor, cerebellopontine angle, Eagleton, 609.
 Tuning fork test nasal sinuses, Oppikofer, 325.
 Turbinate, hypertrophy causing ear neuralgia, Hopkins, 1500.
 Turbinate, meningitis after operation, middle, Harris, 1241.
 Tympanotomy, exploratory, Hays, 625.
 Typhoid internal ear in, Tanaka, 609.
 Typhoid, throat manifestations, Bergogli, 1027.
 ULCER palate simulating syphilis, Barker and Miller, 1415.
 VACCINE in ozena, Horn and Vectors, 288.
 Vapors in treatment of catarrhal deafness, Brown, 309, 625.
 Vertigo, aural, Kerrison, 652.
 Vertigo, Barany test, Jones, 617.
 Vertigo, diagnosis, Fisher, 618.
 Vertigo from intracranial disease, Weisenberg, 617.
 Vertigo in suppurative otitis, Kerrison, 618.
 Vertigo, symptom of primary disease of labyrinth, Shambaugh, 618.
 Vestibular nerve problem, Dunn, 1396.
 Vincent's angina, Deglos, 338; Theisen, 594, 1097.
 Vincent's angina diagnosed in mouth infection, Brumbaugh, 1030.
 Vincent's angina, serology, Taylor and McKinstry, 1018.
 Vincent's disease mouth, McKinstry, 1014.
 Vincent's disease with otitis media, Mathers, 624.
 Vocal cords, bilateral abductor paralysis, Butler, 153.
 WAR aphonia, Liebault, Croissard, 746.
 War deafness, Got, 318.
 War deafness, oral method, de Parrel, 314.
 War injuries ear, Fraser, 661, 700; Marriage, 601; Moure and Pietri, 721; Shuter, 661; Wicart, 704; Wilson, 661; Yearsley, 661.
 War injuries and disease ear, Bryant, 661.
 War injuries, larynx, Harmer, 1434.
 War injury nose, Bobone, 1408.
 War wounds ear, nose, throat, Guyot, 748; Milligan, 747.
 War wounds face, reconstruction, Gillies, 1053.
 War wounds jaw, Platt, Campion, Rodway, 1424.
 War wounds larynx and trachea, Ramonet, 739.
 War wounds maxillae, Fry, 1015.
 War wounds nose, Caboche, 1298.
 Whooping cough, Fonseca, 1056.
 Wound atresia of ear, Rozier, 1389.
 Wounds air tract and esophagus, Gluck, 735.
 Wounds face and maxillae, Moure, 1283.
 Wounds, larynx, Ferrerl, 736.
 Wounds mucosa of mouth and nose, Cole, 1428.
 X-RAYS for cancer oral cavity, Clark, 1417.

